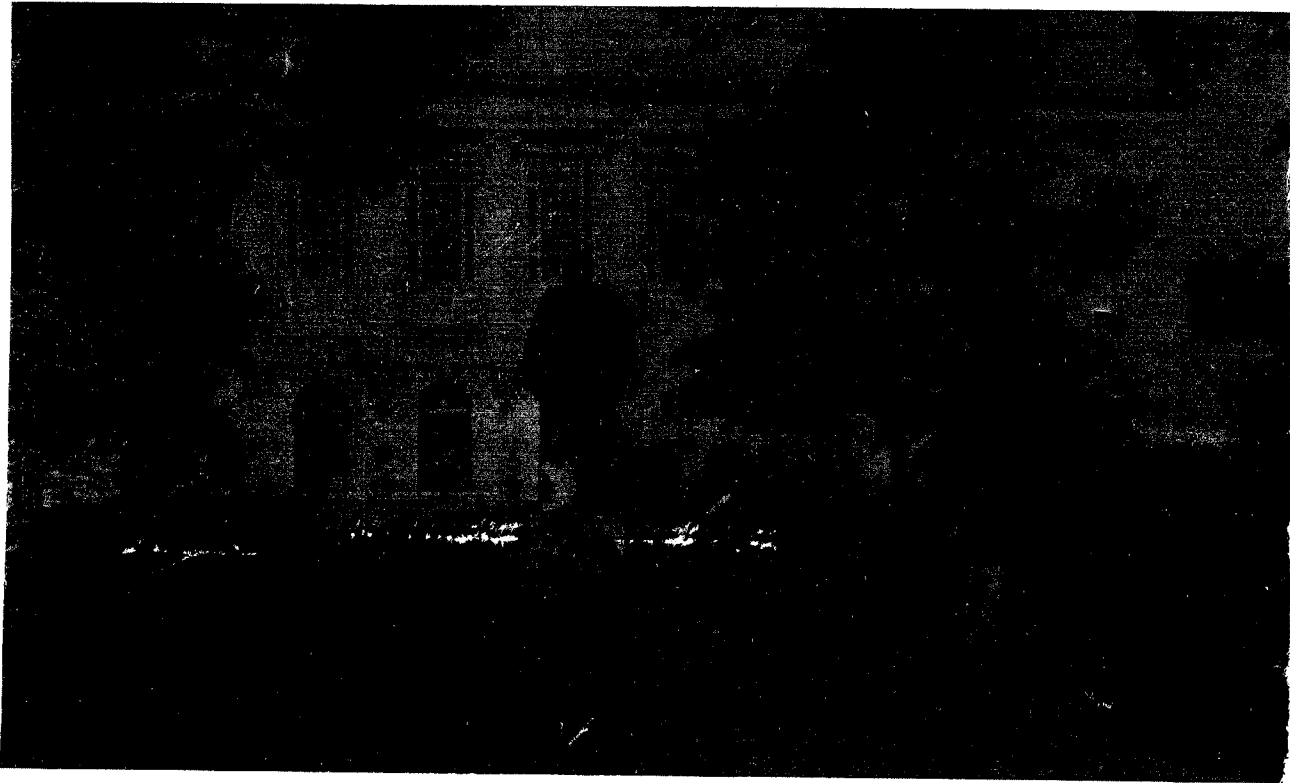


*James A. Young*

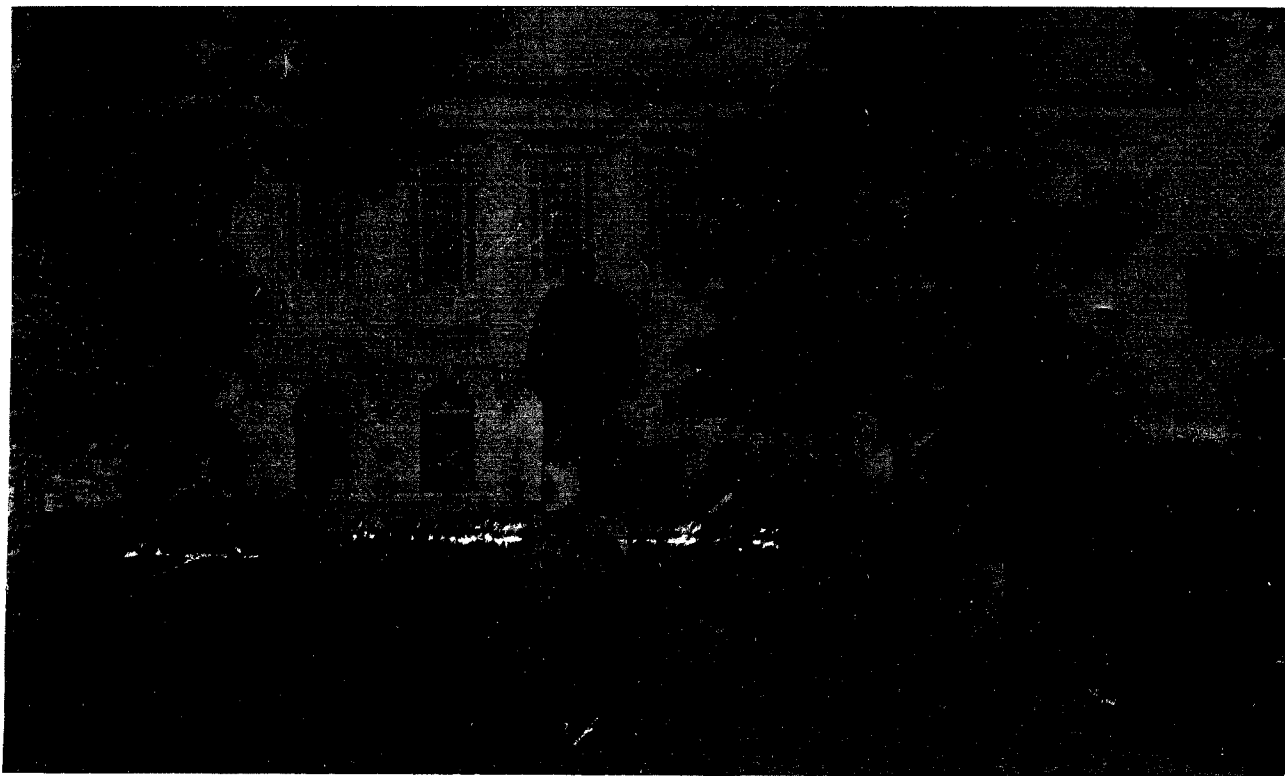
# THE OHIO STATE UNIVERSITY BULLETIN



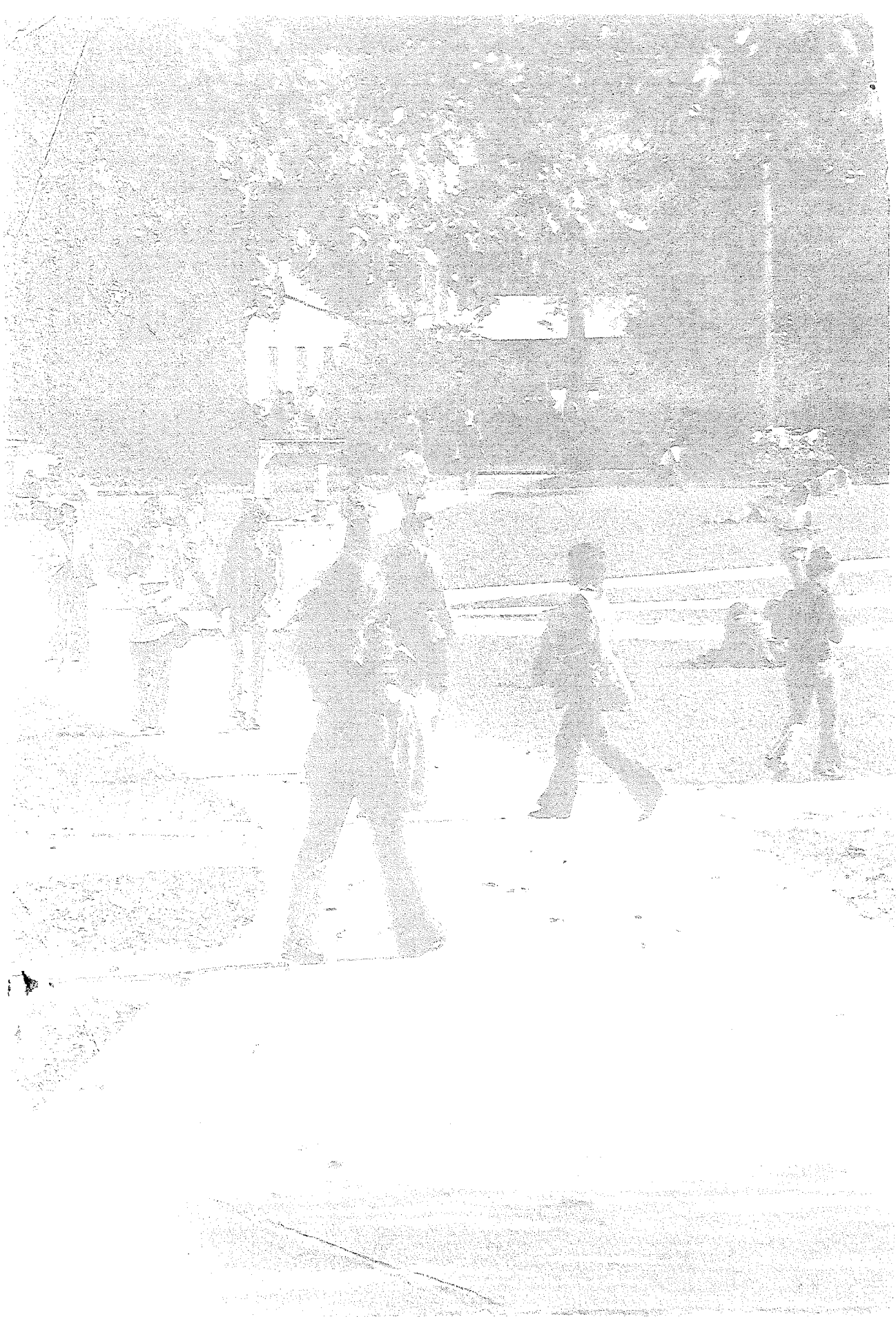
## COURSE OFFERINGS

*James H. Young*

# THE OHIO STATE UNIVERSITY BULLETIN



## COURSE OFFERINGS



# **COURSE OFFERINGS**

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# Organization of Instructional Units

For conveniences of administration, the instructional units—colleges, schools, departments, academic faculties, and divisions—of the University are grouped as follows:

## Undergraduate Colleges

### COLLEGE OF ADMINISTRATIVE SCIENCE

#### SCHOOL

Social Work

#### ACADEMIC FACULTIES

Accounting

Finance

Management Science

Marketing

#### DIVISION

Public Administration

### COLLEGE OF AGRICULTURE AND HOME ECONOMICS

#### SCHOOLS

Home Economics

Natural Resources

#### DEPARTMENTS

Agricultural Economics and Rural  
Sociology

Agricultural Education

Agricultural Engineering

Agronomy

Animal Science

Dairy Science

Food Science and Nutrition

Horticulture

Plant Pathology

Poultry Science

#### INSTITUTE

Agricultural Technical Institute (Wooster)

### COLLEGES OF THE ARTS AND SCIENCES

(See listings for the following Colleges.)

#### COLLEGE OF THE ARTS

#### COLLEGE OF BIOLOGICAL SCIENCES

#### COLLEGE OF HUMANITIES

#### COLLEGE OF MATHEMATICS AND PHYSICAL SCIENCES

#### COLLEGE OF SOCIAL AND BEHAVIORAL SCIENCES

### COLLEGE OF THE ARTS

#### SCHOOL

Music

#### DEPARTMENTS

Dance

Industrial Design

Theatre

#### DIVISIONS

Art

Art Education

History of Art

### COLLEGE OF BIOLOGICAL SCIENCES

#### DEPARTMENTS

Biochemistry

Biophysics

Botany

Entomology

Genetics

Microbiology

Zoology

### COLLEGE OF HUMANITIES

#### DEPARTMENTS

Black Studies

Classics

East Asian Languages and Literatures

English

German

History

Linguistics

Philosophy

Romance Languages and Literatures

Slavic Languages and Literatures

#### DIVISION

Comparative Literature and Languages

### COLLEGE OF MATHEMATICS AND PHYSICAL SCIENCES

#### DEPARTMENTS

Astronomy

Chemistry

Geodetic Science

Geology and Mineralogy

Mathematics

Physics

#### DIVISION

Statistics

## **COLLEGE OF SOCIAL AND BEHAVIORAL SCIENCES**

### **SCHOOL**

Journalism

### **DEPARTMENTS**

Anthropology  
Economics  
Geography  
Political Science  
Psychology  
Sociology  
Speech Communication

## **COLLEGE OF EDUCATION**

### **SCHOOL**

Health, Physical Education, and Recreation

### **ACADEMIC FACULTIES**

Arts in Education, The  
Curriculum and Foundations  
Early and Middle Childhood Education  
Educational Administration  
Educational Development  
Exceptional Children  
Humanities Education  
Industrial Technology  
Science-Mathematics Education  
Special Services  
Vocational-Technical Education

## **COLLEGE OF ENGINEERING**

### **SCHOOL**

Architecture

### **DEPARTMENTS**

Aeronautical and Astronautical  
Engineering  
Aviation  
Ceramic Engineering  
Chemical Engineering  
Civil Engineering  
Computer and Information Science  
Electrical Engineering  
Engineering Graphics  
Engineering Mechanics  
Industrial and Systems Engineering  
Mechanical Engineering  
Metallurgical Engineering  
Photography and Cinema  
Welding Engineering

## **COLLEGE OF PHARMACY**

## **UNIVERSITY COLLEGE**

### **OTHER DEPARTMENTS**

Air Force Aerospace Studies  
Military Science  
Naval Science

## **Professional Colleges**

### **COLLEGE OF DENTISTRY**

#### **DIVISION**

Dental Hygiene

### **COLLEGE OF LAW**

### **COLLEGE OF MEDICINE**

#### **SCHOOLS**

Allied Medical Professions  
Nursing

#### **DEPARTMENTS**

Anatomy  
Anesthesiology  
Medical Microbiology  
Medicine  
Obstetrics and Gynecology  
Ophthalmology  
Otolaryngology  
Pathology  
Pediatrics  
Pharmacology  
Physical Medicine  
Physiological Chemistry  
Physiology  
Preventive Medicine  
Psychiatry  
Radiology  
Surgery

### **COLLEGE OF OPTOMETRY**

### **COLLEGE OF VETERINARY MEDICINE**

#### **DEPARTMENTS**

Veterinary Anatomy  
Veterinary Clinical Sciences  
Veterinary Pathobiology  
Veterinary Physiology and Pharmacology  
Veterinary Preventive Medicine

## **Graduate School**

# University Academic Requirements

## STUDENT RESPONSIBILITY

The student is responsible for knowing his own standing scholastically in reference to the published regulations and standards of the University and of his college.

## THE MARKING AND THE POINT SYSTEM

The grade marks given in all colleges of the University are as follows:

- A Highest quality of passing work; for each credit hour, 4 credit points shall be allowed.
- B Second quality of passing work; for each credit hour, 3 credit points shall be allowed.
- C Third quality of passing work; for each credit hour, 2 credit points shall be allowed.
- D Lowest quality of passing work; for each credit hour, 1 credit point shall be allowed.
- E Failed. This mark indicates (1) that the student has done failing work or (2) that he was absent from the final examination without excuse and his work in the course did not justify a passing mark. Credit for a course in which the Mark E (Failed) has been received can be obtained only by repeating and passing the work in class. (Faculty Rule 37.09.)

### EM Examination

*Section 1.* This mark indicates credit given to students registered in the University on the basis of examinations taken prior to or after admission to the University. The level of achievement that the student must demonstrate on these examinations in order to receive EM credit shall be determined by the department or school offering the course. This credit, up to a maximum of 45 quarter credit hours, or of 70 quarter credit hours in the case of students registered in the School of Nursing who have completed diploma nursing programs and are licensed registered nurses, shall be assigned only upon authorization

of the chairman of such department or the director of such school and with the approval of the executive committee of the college in which the student is registered. Additional examination quarter credit hours may be assigned in the same manner but only with the prior approval of the Council on Academic Affairs.

*Section 2.* Examination credit shall not be given to a student for a course in which he has received a mark at this university. No credit points are allowed for courses in which a mark of EM is given.

- H Honors. This mark shall be used only by the College of Medicine for a student enrolled in the curriculum leading to the degree Doctor of Medicine, when that student has completed a course in that curriculum with an exceptionally high degree of academic performance. H (Honors) credit shall be counted as hours only and shall not be considered in determining a student's point-hour ratio under Faculty Rule 37.05.

### I Incomplete

*Section 1.* An I (Incomplete) indicates (1) that the work of the student in the course is qualitatively satisfactory, but that for legitimate reasons a *small* fraction remains to be completed; or (2) that the record of the student in the course justifies the expectation that he will obtain a passing mark, but he has been unavoidably absent from the final examination.

*Section 2.* The Mark I shall be reported on the grade card together with the mark which the Registrar is authorized to enter on the student's official record if the work is not completed, and a different mark reported to the Registrar in the manner and within the time hereinafter provided. The instructor shall also furnish the chairman of the department or the director of the school with a statement of the work required to be completed.

*Section 3.* The student must complete the work and the instructor must report the final mark at the earliest possible time, but not later than six weeks following the quarter in which the I was received. Upon the petition of the student within the six weeks' period, the executive committee of the college in which the student is enrolled (or, if not enrolled, of the college of last enrollment) may for good reason allow a student additional time in which to complete the work. Generally, this shall not be longer than the end of the quarter following the quarter in which the I was received. Any decision of the executive committee extending the period shall set forth the time in which the student shall complete the work, and a copy of the decision shall be forwarded to the Registrar.

*Section 4.* As soon as the incomplete work has been made up, the instructor, or in the case of his absence from the University, the department chairman or the director of the school, shall file the proper mark in the Registrar's Office. Until such time as the final mark is recorded, the credit hours in the incomplete course shall not be counted or considered for any purpose except that of men's intercollegiate athletic eligibility.

*Section 5.* In no case shall a student who has received the mark I be permitted to repeat the course in which such mark was received until such time as the I has been removed in the manner hereinbefore provided, and then only in such cases as fall within Rule 37.09.

- K Credit. This mark shall be used for work credited from other institutions and service schools and by the Director of Admissions only. K credit shall be counted as hours only and shall not be considered in determining a student's point-hour ratio under Rule 37.05. Credits accepted from another institution are recorded on the student's permanent academic record, but grades are not transferred to this record. Only courses completed at The Ohio State University are included in the cumulative point-hour ratio.
- NP Non-Pass. No credit shall be given for work marked NP. This grade shall not be considered in determining a student's point-hour ratio under Rule 37.05.
- P Progress. This mark may be used to indicate that the student has shown satisfactory progress in courses other than individual studies courses that extend over more than one quarter. Until such time as a final mark is recorded, the credit hours in a P course shall not be counted for any purpose. When a final mark is recorded, all previous P hours shall assume the value of the final mark.
- PA Pass. PA credit shall be counted as hours only and shall not be considered in determining a student's point-hour ratio under Rule 37.05.
- R Audit. This mark indicates that the student has registered to audit the course. No credit hours shall be awarded for this mark. (Faculty Rule 37.11.)
- S Satisfactory  
The mark S may be used to record either satisfactory progress in or completion of work, provided that the course has been approved for this mark by the dean of the college offering the course, and in the case of courses carrying graduate credit, by the Graduate Council. It shall be used as an alternative to U or I in individual-studies courses numbered 593, 693, 793, 993, 998, and 999, and on satisfactory completion by a graduate student of a literature review course or seminar designated by the Dean of the Graduate School as qualifying for the mark of S. S credit shall be counted as hours only and shall not be considered in determining a student's point-hour ratio under Rule 37.05.
- T Temporarily excused. This mark applies only to University-required courses in military science, air force aerospace studies, naval science, or physical education. No credit hours shall be awarded for a course in which a student received a T mark.
- U Unsatisfactory  
The mark U shall be used for unsatisfactory work in courses in which

a student would be entitled to the mark of S if his work had been satisfactory. No credit shall be given for work marked U. This grade shall not be considered in determining a student's point-hour ratio under Rule 37.05.

WF Withdrew failing.

WP Withdrew passing.

X Permanently excused. This mark applies only to University-required courses in military science, air force aerospace studies, naval science, or physical education. No credit hours shall be awarded for a course in which a student received an X mark.

### **PASS/NON-PASS OPTION PROCEDURES AND POLICIES**

Pass/non-pass is an option under which an undergraduate student may take a portion of his course work without receiving the usual letter grades (A, B, C, D, and E). Instead, he receives PA if he passed or NP if he failed. PA credit counts toward graduation.

The following is taken from the section of Faculty Rule 35.07 that applies to pass/non-pass policies.

Section 1. This grading pattern may be chosen by undergraduates or continuing education students for a maximum of 30 credit hours.

Section 2. Among these 30 hours, an undergraduate student may elect pass/non-pass grading for any or all University required courses in physical education and the National Defense Option or its alternatives (12 credit hours of courses not otherwise specified in the degree requirements of the student's selected curriculum).

An undergraduate student who has accumulated a point-hour ratio of 2.0 or higher may elect courses for pass/non-pass that are not required or designated as required electives in the curriculum leading to the degree for which the student is a candidate.

A student registered in the Division of Continuing Education who has an accumulated point-hour ratio of 2.0 or higher may elect courses for pass/non-pass for a maximum of 30 hours.

Section 3. Hours graded PA count toward the degree. Pass/non-pass marks are

not computed in the point-hour average of the student.

Section 4. On or before noon of the sixth Saturday of a quarter, or the third Saturday of a term, a student must have declared his intention to take a course on the pass/non-pass basis by filing the appropriate forms with the dean of his college or the dean's authorized representative (students in physical education, military science, air force aerospace studies, and naval science file the forms in those departmental offices). A student may not change to or from the pass/non-pass option after noon of the sixth Saturday of a quarter, or the third Saturday of a term.

Section 5. The instructor will submit PA or NP marks to the Registrar for those students selecting the grading pattern.

Section 6. The grade PA is the equivalent of the grades A, B, C, D, and the grade NP is the equivalent of the grade E.

### **CANCELLATION**

Cancellation of the pass/non-pass option is permitted until noon of the sixth Saturday of the quarter or third Saturday of the term. The student should request a cancellation form from a counselor in his college office or, if he is in University College, from his academic adviser.

### **WITHDRAWAL PROCEDURES AND POLICIES**

Withdrawal procedures and policies are currently under revision. Contact the college office for procedures.

### **COMPULSORY COURSE WITHDRAWAL**

An enrollee of any undergraduate college who fails to attend a scheduled course before Saturday noon of the first week of classes, may, at the option of the department, be disenrolled immediately from that course. In the event a department chooses to take such action, it will be the responsibility of the department chairman to notify the student's college office. A change ticket removing the course from the student's schedule will be prepared in the college office, and a copy shall be forwarded to the Office of the Registrar (Faculty Rule 41.07).

A student delayed in reporting to classes may reserve class space for a period of time up to two calendar days by notifying in writing the department of each course for which he is scheduled, giving his name and college, the course name, number, and



time he is scheduled to attend, when he will report to classes, and the reasons for his delay.

### REPETITION OF COURSES

A student who has received a mark of E or NP in a required course at this university may repeat the course for credit only as provided in Faculty Rule 37.07. A student who has received a mark of E or NP in any other course at this university may repeat the course for credit at his option.

An undergraduate or professional student who has received a grade of D (lowest quality of passing work) in a course at this university may repeat the course for credit only upon the recommendation of the executive committee and with the approval of the dean of his college. A graduate student, as defined in Faculty Rule 41.03, may, when approval is given by an adviser, repeat for credit any course in which he has received a grade of D.

An undergraduate or professional student, as defined in Rule 41.03, who has received a grade of A, B, C, or PA in a course taken at this university or elsewhere, may repeat the course only as an auditor, upon receipt of permission of the chairman of the department or director of the school and the dean of his college. A graduate student, as defined in Rule 41.03, may, after a period of five years, and when approval is given by the graduate committee of his department and Dean of the Graduate School, repeat for credit a course in which he has received a mark of A, B, or C.

A student who has audited a course may subsequently repeat the course for credit with the permission of the executive committee of his college.

The credit hours for a repeated course shall in no case be counted more than once in meeting graduation requirements.

### REMOVAL OF FAILURE IN A REQUIRED COURSE

A student is responsible for repeating in class, at his first opportunity, a *required* course in which he has failed, unless the executive committee of the college authorizes a substitute course.

### ALTERATION OF MARKS

At the close of each quarter, the Registrar's Office notifies each student by mail of the

marks earned during the quarter. These marks become a part of the official record of the student and are not subject to change except upon official authorization of the chairman of the department or director of the school and the dean of the college. Such changes shall be made only when a clerical error has been discovered.

### THE POINT-HOUR RATIO

A student's academic standing for a quarter is expressed by his point-hour ratio. This ratio is determined by dividing the total number of points earned by the total number of credit hours scheduled or undertaken. Courses in which the marks EM, H, I, K, NP, P, PA, R, S, T, U, X, WF, or WP are given are not included in the computations. Courses in which the marks A, B, C, D, or E are given are computed according to the scale: A = 4.0, B = 3.0, C = 2.0, D = 1.0, and E = 0. The following example shows how a point-hour ratio is determined.

	HOURS	GRADE	POINTS
Course No. 1	5	A	20
Course No. 2	3	C	6
Course No. 3	(3)	I	
Course No. 4	3	E	0
Course No. 5	(3)	PA	
	11		26

Point-hour ratio: 2.36

When the final grade on Course No. 3 is recorded, the points and hours will be included in the computation of the student's point-hour ratio. When a student has a record for two or more quarters, he will have a cumulative point-hour ratio determined by dividing the total points earned by the total hours undertaken.

### UNIVERSITY CLASS RANKING SYSTEM

Student rank in all the undergraduate colleges is based on total credit hours completed and recorded.

RANK	EARNED CREDIT HOURS	CODE
Freshman	0- 48	1
Sophomore	49- 97	2
Junior	98-146	3
Senior	147-195	4
Fifth Year	196 and more	5

Students enrolled in the professional divisions or colleges of Allied Medical Professions, Dentistry, Education-Professional,

Law, Medicine, Nursing, Optometry, Pharmacy, and Veterinary Medicine begin their rank over again, as follows:

RANK	CODE
First Year	1
Second Year	2
Third Year	3
Fourth Year	4

Should there be any doubt in a student's mind concerning the correctness of his rank in the professional divisions and colleges, he should consult with the division or college concerned.

Students enrolled in the Graduate School receive the rank of either M (Master's) or P (Ph.D.).

### **WARNING, PROBATION, AND DISMISSAL: MINIMUM SCHOLASTIC REQUIREMENTS**

These requirements shall apply only to undergraduate students. The academic standards controlling warning, probation, and dismissal of professional and graduate students shall be established by rule by the faculties of the colleges in which the professional students are registered, or of the Graduate School if the student is a graduate student.

The promulgation of these rules, and their amendment or repeal, shall be subject to the approval of the Board of Trustees.

A transfer student from another university who is admitted to advance standing in this University shall have his point-hour ratio and deficiency points computed only upon work done at this University.

In order to be in good academic standing at this University, a student must carry a cumulative point-hour ratio of 2.00 or better. A student whose point-hour ratio is less than 2.00 will be subject to warning, probation, or dismissal based upon his previous record and the number of deficiency points he possesses.

Deficiency points are defined as the number of points a student would need in order to raise his cumulative point-hour ratio to 2.00. (See previous section on point-hour ratio). A student with a point-hour ratio greater than 2.00 is said to have no deficiency points. Deficiency points may be calculated by subtracting the number of points earned from twice the number of credit hours attempted for the grades A, B, C, D, or E.

A student who has between one and fourteen deficiency points will be warned by his college office that he is in academic difficulty.

A student who has 15 or more deficiency points is subject to academic dismissal from the University or to probation. A student will be placed on probation after the first quarter in which he accumulates 15 or more deficiency points; and the college in which he is registered will indicate to him what conditions he must meet in order to continue to enroll at the University. At the end of each succeeding quarter the college will review his record and will take appropriate action to restore him to good standing, to place him on warning, continue him on probation, or dismiss him as the facts of his case may dictate. A student who has been dismissed will not be permitted to enroll for any courses at the University until he has been reinstated by his college or school.

If at any time the preparation, progress, or success of a student in his assigned work is determined to be unsatisfactory, the executive committee of the college or school in which he is registered shall be empowered to place him on probation.

Notice of dismissal or probation from the University shall be sent by the dean of the college or school in which the student is registered to the student and to the student's parents or guardian, unless the student is 21 years or older or married and has notified the Registrar's Office not to send the grade report to his parents or guardian.

A student who is dismissed from the University may petition his college or school for later reinstatement in the University. Policies regarding reinstatement are developed by each college or school. A student who is reinstated following an academic dismissal shall be subject to any special requirements which may be determined appropriate by the executive committee of the college.

In colleges or schools which require a point-hour ratio higher than 2.00 to remain in good standing a student may not be permitted to enroll in that college even though his point-hour ratio is above 2.00 and he is in good standing with the University. Such students are encouraged to reconsider their academic plans and transfer to another college or school of the University.

# Graduation Requirements

## REQUIREMENTS FOR AN UNDERGRADUATE DEGREE (Faculty Rule 49.03)

To obtain an undergraduate degree from this University an undergraduate student must:

- a. Have been enrolled in the college, the Colleges of the Arts and Sciences, or the school recommending that degree during the last two quarters of work necessary to complete the degree requirements. The executive committee of the college, the Colleges of the Arts and Sciences, or the school recommending the degree may waive this requirement to the extent of not more than one quarter's enrollment if the student has six quarters in full-time residence (to be in full-time residence in any quarter a student must be enrolled in courses carrying twelve or more quarter hours credit) at this University, including a minimum of forty-five quarter credit hours earned through regular course enrollment at this University during the junior and senior years.
- b. Have earned through regular course enrollment a minimum of forty-five quarter hours credit from this University.
- c. Have satisfactorily completed the number of credit hours required for the curriculum he is pursuing. The minimum number of credit hours required in each curriculum shall include the credit hours required under Rules 31.0701 and 31.0703; however, excuses granted under Rule 31.0705 shall not reduce the stated minimum number of credit hours required in the curriculum for a degree or a certificate. Credit hours are considered as "satisfactorily completed" only if the student has received, at this University, the mark A, B, C, D, EM, K, S, or PA in those hours (Rule 35.07).
- d. Have earned credit points (Rule 37.03) totaling at least twice the number of credit hours attempted at this

University for which calculable grades (A, B, C, D, or E) were given.

- e. Have satisfactorily met all additional college and curricular requirements for the degree involved.
- f. Have filed an application for the degree in accordance with rules prescribed by the college or school.
- g. Waiver of any part of this Rule (49.03) in the case of individual students may be made only by the Council on Academic Affairs following prior approval by the executive committee of the college. The Provost and Vice President for Academic Affairs shall transmit all affirmative actions of the Council on Academic Affairs under this section to the secretary of the student's college and to the Registrar for notation on the student's permanent record.

## REQUIREMENTS FOR A GRADUATE OR PROFESSIONAL DEGREE (Faculty Rules 49.05 and 49.07)

To obtain a graduate or professional degree from this University, the graduate or professional student must have met the minimum requirements established by the graduate council or the college recommending the degree and approved by the Board of Trustees.

## DEGREES AND CERTIFICATES

Degrees and certificates are awarded by the Board of Trustees upon the recommendation of the college faculties, or the Graduate Council, and the Faculty Council, as transmitted to the Board by the President.

## COLLEGE REQUIREMENTS

Each college has certain requirements which must be met by every student seeking to earn a degree in that college. The specific course requirements for the curricula administered by a given college can be found in the catalog for that college. In addition to these, the University has established certain requirements outlined below.

## UNIVERSITY REQUIRED COURSES

### BASIC EDUCATION REQUIREMENTS

Every curriculum in the undergraduate colleges includes a body of courses from which 45 credit hours must be selected to

ensure that each student is given the opportunity to become acquainted with the three basic areas of academic study—the humanities, the social sciences, and the natural sciences—by selecting 15 credit hours in each of these three areas. These courses are specifically stated in the individual college catalogs under the heading Academic Requirements.

Students transferring from other colleges or universities can meet part or all of the following requirements with approximately equivalent courses. Credits for each transfer student shall be reviewed by the Director of Admissions and the appropriate college administrators, and credit in all courses which meet the spirit of these Basic Education Requirements shall be accepted.

The objectives of this part of the curriculum, as set forth by the University faculty, are as follows:

#### **Humanities (15 credit hours)**

The objectives are to introduce the student to his possibilities for continuing growth as a thoughtful and reasoning person, sensitive to the aspirations and attainments of others; to acquaint him to at least some degree with the treasures of human thought and expressions at his command; and to develop in him a continuing desire to have his full share of the legacy of all creative efforts.

#### **Social Sciences (15 credit hours)**

The objectives are to make sure that the student has at least a basic understanding of the fundamental ideas upon which our society has been built, the social institutions through which these ideas have been given effective meaning, and the never-ending process of development through free choice limited only by concern for the rights and well-being of others. Emphasis will be put upon the values of a free society and the responsibility of the individual for participating actively in the issues and decisions of the day.

#### **Natural Sciences (15 credit hours)**

The objectives are to acquaint the student with the kinds of problems which lend themselves to possible solutions through the use of science, to introduce him to differing scientific techniques through significant illustrative experience, to give him a sense of perspective in the development

of science, and to develop in him an understanding of the basic community of all scientific disciplines.

#### **NATIONAL DEFENSE OPTION**

In addition to the above requirements, all students enrolled in these colleges will select one of the following:

*Either*

1. Twelve credit hours of courses in military science, air force aerospace studies, or naval science, which offer the freshman an excellent opportunity to learn more about defense problems and the military service so that he can make an informed decision to continue his military training or to terminate it at the end of two years.

*Or*

2. Twelve credit hours of courses not otherwise specified in the degree requirements of the selected curriculum.

#### **PHYSICAL EDUCATION REQUIREMENT**

All students entering any of the undergraduate colleges, schools, or divisions, including Allied Medical Professions, Nursing, and Dental Hygiene, are required to schedule one hour of physical education each quarter offered until a total of three quarters of credit has been earned.

Transfer to other colleges of this University shall not constitute a waiver of unfulfilled requirements of this rule.

#### **EXCUSES FROM REQUIRED COURSES**

The college in which a student is enrolled may excuse a student from course requirements imposed by that college.

The requirement of physical education is a University requirement. The President and the departments of instruction directly concerned may grant by faculty regulation excuses from these courses.

#### **RETROACTIVE GRADUATE CREDIT**

Students registered in an undergraduate college, the Division of Continuing Education, or a professional college cannot receive graduate credit for courses taken when the student is not enrolled in the Graduate School. (See the following for exceptions.)

**GRADUATE CREDIT  
FOR UNDERGRADUATES**

An undergraduate student with graduate student potential who does not need to register full-time in order to complete his baccalaureate degree may petition to take certain courses for graduate credit, provided that:

1. The credit for the course is not needed to meet his baccalaureate degree requirements.
2. His cumulative point-hour ratio is 3.0 or above.
3. He secures permission *before registering for the courses* from:
  - a) The instructor in charge of the course.
  - b) The secretary of his college.

- c) The chairman of the graduate committee of the department in which the courses are to be taken.

- d) The Graduate School.

The senior petition form for obtaining the necessary approvals is available in the Graduate School Office.

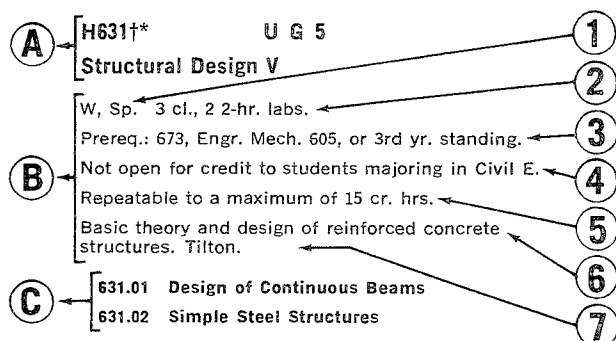
He must achieve a grade of B or better in such courses in order to obtain graduate credit. A student cannot use these courses for graduate credit until he is admitted to the Graduate School and until the department in which he wishes to specialize accepts the work for graduate credit. Not more than 15 quarter hours of such work may be counted toward the student's advanced degree.



# Courses of Instruction

The following pages describe courses of instruction offered by the University at undergraduate, graduate, and professional levels. These descriptions are accurate as of October 1, 1972. Courses and programs are continually being improved, but Bulletin deadlines preclude the insertion of more recent changes. **The most current information regarding credit hours, sections, days, times, buildings, rooms, and instructors may be found in the quarterly Master Schedule of Classes.**

A sample course listing is provided below.



## EXPLANATION OF COURSE LISTINGS

- A** The course number: 631 (An "H" prefix indicates the course is open only to students enrolled in college Honors Programs, and others as designated by departments.)

**Note**—The University's Classification and Course Numbering System appears in detail in the following section.

A dagger (†) denotes that the course will not be offered this year

An asterisk (\*) indicates that the course is offered every other year

The instructional level: U G

U = Undergraduate  
 UG = Advanced Undergraduate and Graduate  
 G = Graduate  
 P = Professional (for professional students enrolled in that particular college)

Credit hours: 5

The course title: Structural Design V

## **B** 1 Quarters of Offerings:

Su. = Summer W. = Winter  
 A. = Autumn Sp. = Spring  
 Summer Quarter is further divided into 1st Term and 2nd Term. See the University Calendar in any catalog for dates. Lack of staff or low student enrollment may preclude offering a course, particularly at the advanced level, every quarter for which it is authorized.

- 2** Classroom and laboratory hours: 3 cl., 2 2-hr. labs. In the sample provided, the 5 hours of credit are earned through satisfactory completion of course work which involves attending class three days a week and attending two 2-hour laboratory periods each week.

- 3** Prerequisites: 673, Engr. Mech. 605, or 3rd yr. standing. The course number(s) or other information indicates the preparation or classification required to enroll in the course. If no department name is listed, the course number refers to the specific course within the same department. If a class standing such as "3rd-year standing" is listed, only students with that or higher class level are eligible for enrollment. The school, department, or college office should be consulted in cases of question as to eligibility for taking the course.

The number of the course implies the prerequisites listed in the University Classification and Course Numbering System shown in the following section.

- 4** Additional information affecting a student's enrollment in a course: Not for credit to students majoring in Civil Engineering.
- 5** Repeatability Clause: The repeatability clause indicates the maximum number of hours a course may be repeated for credit.
- 6** A brief description of the course: Basic theory and design of reinforced concrete structures.

- 7** Instructor's name: Tilton.

## **C** The decimal subdivisions:

The numbers 631.01 and 631.02 indicate subdivisions of the generic number, 631. Whenever decimals appear, a student should register for the entire number (including the desired decimal subdivision) rather than the generic number alone.

## UNIVERSITY CLASSIFICATION AND COURSE NUMBERING SYSTEM

Established 1967-68, the system of numbering courses offered by the University is as follows:

NUMBERS	COURSES	PREREQUISITES
<b>000-099</b>	<b>Non-Credit Courses (except certain seminars and colloquia)</b>	
	Orientation courses;	None
	Remedial courses;	
	Experience courses with student not under direct supervision of faculty;	
	Courses with credit added to graduation requirements.	
<b>100-299</b>	<b>Courses Providing Undergraduate Credit Only</b>	
100-199	Basic courses providing undergraduate credit, but not to be counted on a major or field of specialization in any department;	None, or specified course(s) numbered 100-199.
	Beginning courses, required or elective courses which may be prerequisite to other courses.	
200-299	Basic courses providing undergraduate credit which may be counted on a major or field of specialization (in your and/or other departments).	45 qtr. hrs. in collegiate courses, exclusive of ROTC and physical education; or  Specified course(s) numbered 100-199; or  Satisfactory placement on entrance examinations when applicable.
<b>300-499</b>	<b>Courses Providing Undergraduate Credit or Professional Credit</b>	
	Intermediate courses providing undergraduate credit which may be counted on a major or field of specialization;	90 qtr. hrs. in collegiate courses, exclusive of ROTC and physical education; or
	Basic courses in the professional division of the College of Education.	Specified course(s) numbered 100-399.
	Basic courses in the colleges of Dentistry, Optometry, Pharmacy, and Veterinary Medicine.	

NUMBERS	COURSES	PREREQUISITES
500-699	Undergraduate Courses Which Provide Undergraduate Credit and Which May Provide Graduate Credit For Graduate Students Registered in Sections of Courses Taught by Members of the Faculty; Courses Providing Professional Credit and Which May Provide Graduate Credit for Graduate Students Registered in Sections of Courses Taught by Members of the Faculty.	
500-599	Intermediate courses providing undergraduate credit which may be counted on a major or field of specialization, and may (or may not) provide graduate credit <b>only in other departments</b> ;  Intermediate courses in the professional division of the College of Education.  Intermediate courses in the colleges of Dentistry, Optometry, Pharmacy, and Veterinary Medicine;  Basic courses in the colleges of Law and Medicine.	15 qtr. hrs. in courses in the same discipline numbered 200 or higher; or  10 qtr. hrs. in courses numbered 200 or higher in the same discipline, plus 10 qtr. hrs. in courses numbered 200 or higher in specified allied disciplines.  Baccalaureate degree.
600-699	Advanced undergraduate courses which provide undergraduate credit that may be counted on a major or field of specialization, and may (or may not) provide graduate credit (in your and/or other departments);  Advanced courses in professional divisions and professional colleges.	15 qtr. hrs. in courses in the same discipline numbered 300 or higher; or  10 qtr. hrs. in courses numbered 300 or higher in the same discipline, plus 10 qtr. hrs. in courses numbered 300 or higher in specified allied disciplines.
700-799	Courses Which Provide Graduate Credit For Graduate Students Registered in Sections of Courses Taught by Members of the Faculty and Which Provide Undergraduate or Professional Credit. Courses Which Provide Professional Credit and Which May Provide Graduate Credit for Graduate Students Registered in Sections of Courses Taught by Members of the Faculty.  Graduate courses providing undergraduate and graduate credit. Undergraduate credit may be counted on a major or field of specialization for high ability undergraduates;  Advanced courses in professional divisions and professional colleges.	15 qtr. hrs. in courses in the same discipline numbered 400 or higher plus additional specified course(s) numbered 600 or higher.
800-999	Courses Providing Graduate Credit Only	30 qtr. hrs. in courses in the same discipline; or  20 qtr. hrs. in the same discipline plus 25 qtr. hrs. in specified allied disciplines.



## Accounting

Office: 452 Hagerty Hall, 1775 College Road

**Professors** Fertig (Chairman), Burns, A. Gordon (Emeritus), Greenball, Heckert (Emeritus), Kindig, Kollaritsch, Livingstone, McCollough, McCoy, and Stanley; **Associate Professors** Baumler, Brush, Burnham, Johnson, Kinard, and Northrup; **Assistant Professors** Bartos, Bolon (Emeritus), K. Gordon, Krasniewski, Li, Pack, and Scott.

### 201 U 5 Outline of Accounting

A, Sp. 5 cl.

Not open to students with credit for 211 or equiv.

Survey of accounting in modern business; intended for students whose major is in fields other than business.

### 211 U 5 Introduction to Accounting

Su, A, W, Sp. 5 cl.

H211 (honors) may be available to students enrolled in a college honors program or by permission of faculty.

Prereq. or concur.: Econ. 200, 201, or equiv.

Not open to students with credit for 201 or equiv.

The uses of accounting reports in management decisions and in control of business enterprises.

### 212 U 5 Introduction to Accounting

Su, A, W, Sp. 5 cl.

H212 (honors) may be available to students enrolled in a college honors program or by permission of faculty.

Prereq.: 211 or equiv.; and Econ. 200, 201, or equiv.

Not open to students with credit for 201 or equiv.

The accrual interpretation of transactions and fundamentals of income determination, uses of financial statements by persons outside the firm.

### 221 U 5 Accounting Methods

Su, A, W, Sp. 5 cl.

Prereq.: 212 or equiv.

The application of accounting techniques to recording and reporting financial information; special emphasis given to accounting systems and the use of working papers.

### 415† U 5 Factory Costs

5 cl.

Prereq.: 212 or equiv.

Not open to majors in Acc.

Survey of industrial cost accounting for the student whose major interest is in fields other than accounting.

### 493 U 2-5 Individual Studies

Su, A, W, Sp.

Prereq.: Written permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

Individual study projects in selected areas in accounting.

### 494 U 2-5 Group Studies

Su, A, W, Sp.

Prereq.: Written permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

Group study projects in selected areas in accounting.

### 523 U 4 Financial Accounting I

Su, A, W, Sp. 4 cl.

Prereq.: 221 or equiv.

Not for graduate credit for majors in Acc.

Analysis and interpretation of financial statements, advanced study of concepts of asset valuation and income determination.

### 524 U G 4 Financial Accounting II

Su, A, W, Sp. 4 cl.

Prereq.: 523 or equiv.

A continuation of 523 with special emphasis on the accounting entity and business combinations.

### 525 U G 4 Cost Accounting

Su, A, W, Sp. 4 cl.

Prereq.: 221 or equiv.

Not open to students with credit for 415 or equiv.

Not for graduate credit for majors in Acc.

Basic concepts and techniques of industrial accounting; historical and standard costs; budgeting; management use of cost accounting information.

### 535 U G 4 Advanced Cost Accounting

Sp. 4 cl.

Prereq.: 525 or equiv.

Advanced study of selected applications of cost accounting concepts to management problems involving performance measures with emphasis on budgetary control and standard costing.

### 626 U G 4 Tax Accounting I

Su, A, W, Sp. 4 cl.

Prereq.: 201 or 212 or equiv.

Not for graduate credit for majors in Acc.

Fundamentals of federal, state, and local taxation, with major emphasis upon the federal income tax provisions having common application to all types of taxpayers.

### 627 U G 5 Auditing Principles and Procedures

Su, A, W, Sp. 5 cl.

Prereq.: 524 and 525 or equiv.

Basic concepts and standards of auditing; audit procedures and working papers; internal and external audit reports.

### 628 U G 4 Accounting Practice

Su, A, W, Sp. 4 cl.

Prereq.: 524 and 525 or equiv.

A study of the accounting concepts and standards underlying corporate and non-corporate financial statements, including consideration of typical accounting problems.

**631 U G 5****Computer Accounting in Business**

Su, A, W, Sp. 2 1-hr. lec., 1 2-hr. case discussion per week.

Prereq.: 221, Compu. and Info. Sc. 211 or 241, and Econ. 442.

The principles and analytical methods used in business data processing systems; file design and data organization in processing activities; practice problems in functional business areas.

**636 U G 3****Tax Accounting II**

Sp. 3 cl.

Prereq.: 221 and 526 or equiv.

Advanced study of complex problem areas in taxation confronting the professional tax advisor, emphasizing the structure of tax provisions and opportunities for planning and control.

**689 U G 15****Field Work in Accounting**

Su, A, W, Sp.

Open only to students who hold internships with public accounting firms or with industrial concerns, for which advance approval has been given by the department. 15 cr. hrs. and one qtr. of residence added to graduation requirements for students in this course.

**693 U G 2-5****Individual Studies**

Su, A, W, Sp.

Prereq.: Written permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Individual reports on selected accounting problems in the following fields of accounting; registration for this course number to be followed by the letter designating the field of study.

- a. Auditing
- b. Budgeting
- c. Cost Accounting
- d. Systems
- e. Taxes
- f. Theory

**694 U G 2-5****Group Studies**

Su, A, W, Sp.

Prereq.: Written permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Registration to be followed by the letter designating the field of study.

- a. Auditing
- b. Budgeting
- c. Cost Accounting
- d. Systems
- e. Taxes
- f. Theory

**711 U G 5****Introduction to Management Accounting**

A, Sp. 3 cl. and conf.

Prereq.: Stat. 505.

A survey of accounting principles from the viewpoint of management; income measurement; analysis and interpretation of accounting data, internal reports.

**712† U G 3****Introduction to Management Accounting**

3 cl. and conf.

Prereq.: Approval of the Office of Graduate Business Programs.

Continuation of 711.

**811 G 3****Business Controls**

A, W, Sp.

Prereq.: 711 or equiv.; and Bus. Adm. 801.01.

Not for graduate credit for majors in Acc.

Examination of business planning and the controls over operations and property; the use of accounting data in the management enterprise.

**831 G 3****Accounting Systems**

Sp. 3 cl.

Prereq.: 811 or written permission of instructor.

The principles underlying the design and installation of accounting systems.

**844 G 5****Theory and Practice**

A. 3 cl.

Prereq.: 524 or equiv.

Readings, reports, and advanced problems in accounting.

**845 G 3****Controllershship**

W. 3 cl.

Prereq.: 811 or written permission of instructor.

The accounting executive's role in the management of an enterprise; accounting data for planning, coordination, control, and protection.

**846 G 4****Advanced Tax Accounting**

W. 3 cl.

Prereq.: 526 or equiv.

Tax alternatives and tax planning; tax research; postfiling problems and procedures.

**847 G 5****Advanced Auditing**

Sp. 3 cl.

Prereq.: 627 or equiv.

Growth of the auditor's liability and its effects on auditing procedures; advanced auditing problems; discussion of current material affecting the auditing profession.

**851† G 3****Accounting Problems of Financial Institutions and Fiduciaries**

W. 3 cl.

Prereq.: 30 cr. hrs. in Acc. or equiv.

Accounting principles and problems peculiar to banks, insurance companies, brokerage and investment houses, receivers, executors, and trustees.

**852† G 3****Governmental Accounting**

Sp. 3 cl.

Prereq.: 30 cr. hrs. in Acc. or equiv.

The application of accounting principles to government; problems relating to funds, appropriations, and allotments.

**853 G 3****Accounting Policies of Regulatory Agencies**

Sp. 3 cl.

Prereq.: 30 cr. hrs. in Acc. or equiv.

Accounting policies of the Federal Power Commission, Federal Communications Commission, Securities and Exchange Commission, and Ohio Public Utilities Commission.

**854 G 3****Accounting Aspects of Business Policy Determination**

W. 3 cl.

Prereq.: 811 or written permission of instructor.

Case studies with particular attention to accounting analysis and application thereof to business problems.

**861 G 3****Seminar in Accounting**

Su, A, W, Sp.

Repeatable to a maximum of 9 cr. hrs.

**998 G Arr.****Research in Accounting: Thesis**

Su, A, W, Sp.

Research for thesis purposes only.

**999 G Arr.****Research in Accounting: Dissertation**

Su, A, W, Sp.

Research for dissertation purposes only.

**Administrative Science****H101 U 3-5****Business and Society**

A, W, Sp. 3-5 cl.

Prereq.: Fresh. or soph. standing, and approved application for Administrative Science Honors Program. Repeatable to a maximum of 15 cr. hrs.

A critical examination of the socioeconomic framework of business; seminar discussion of selected readings.

**301 U 1-5****College Seminar**

Su, A, W, Sp. 2-5 cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

**Aeronautical and Astronautical Engineering**

Office: 328 Civil and Aeronautical Engineering Building, 2036 Neil Avenue

**Professors** Von Eschen (Chairman), Bailey, Burggraf, Edse, Gatewood, Lee, Li, Nerem, Petrie, and Stewartson (Visiting); **Associate Professors** Gregorek and Mallett; **Assistant Professors** Foster and Young.

**200 U 4****Elements of Aeronautics and Astronautics**

A. 3 cl., 1 2-hr. lab.

Prereq.: Math. 153 and Physics 132.

Not open to students with credit for 400.

An introduction to the aerodynamics, propulsion, structural design, stability, and control of flight vehicles; emphasis on the mechanics of fluids.

**201 U 4****Elements of Aeronautics and Astronautics**

W. 3 cl., 1 2-hr. lab.

Prereq.: 200 or 400.

Not open to students with credit for 401.

A continuation of 200 with emphasis on aircraft propulsion, flight performance, static stability, and control.

**202 U 4****Elements of Aeronautics and Astronautics**

Sp. 3 cl., 1 2-hr. lab.

A continuation of 201 with emphasis on the structural loads imposed on flight vehicles and the resulting stresses.

**405 U 4****Thermodynamics**

A. 4 cl.

Prereq.: 201 and Math. 415.

Introduction to the properties and behavior of aerodynamic fluids from microscopic and macroscopic points of view.

**440 U 4****Flight Vehicle Structures I**

A. 4 cl.

Prereq.: 201, Math. 415 and 416, and Engr. Mech. 420.

Load distributions, temperature distributions, and allowable stresses for flight vehicle structures; derivations of basic equations for analysis of flight vehicle structural components.

**460 U 4****One-Dimensional Gasdynamics**

W. 4 cl.

Prereq.: 405 and Math. 415.

One dimensional compressible flow including chemical reactions.

**480 U 4****Mathematical Methods in Aeronautical and Astronautical Engineering**

W. 4 cl.

Prereq.: Math. 415 and 416.

Application of selected topics in mathematics to analysis in the field of aeronautical and astronautical engineering.

**510 U 4**  
**Aeronautical Laboratory**

W, Sp. 2 cl., 2 3-hr. lab.

Prereq.: 540 and 550.

Laboratory demonstrations and experiments in aerodynamics, aeroelasticity, propulsion, and structures of flight vehicles.

**515 U 4**  
**Preliminary Design of Flight Vehicles**

Sp. 2 cl., 2 3-hr. lab.

Prereq.: 520, 541, and 550.

**520 U G 4**  
**Flight Vehicle Dynamics**

W. 4 cl.

Prereq.: 201 and 480.

Introduction to the concept of dynamic stability and to the dynamics of rigid aircraft and satellite vehicles.

**540 U G 4**  
**Flight Vehicle Structures II**

W. 4 cl.

Prereq.: 440, 480, and Engr. Mech. 415.

Stress analysis of flight vehicle structures.

**541 U G 4**  
**Structural Design of Flight Vehicle Components**

A. 2 cl., 2 3-hr. labs.

Prereq.: 540.

Design of joints; tension, bending, shear, and compression members; diagonal tension field beams, box beams, and pressure structures.

**550 U G 4**  
**Principles of Flight Vehicle Propulsion**

Sp. 4 cl.

Prereq. or concur.: 561.

Functional characteristics and performance of rocket, ramjet, turbojet, turbo propeller, pulse jet, and hybrid engines.

**560 U G 4**  
**Classical Aerodynamics**

Sp. 4 cl.

Prereq.: 201, and Math. 415 and 416.

Fundamentals of steady incompressible, non-viscous aerodynamic flows with applications to airfoils and finite wings.

**561 U G 4**  
**Compressible Aerodynamics**

A. 4 cl.

Prereq.: 460, 480, and 560.

The fundamentals of the aerodynamics of compressible fluids.

**570 U G 4**  
**Viscous Flow and Heat Transfer**

A. 4 cl.

Prereq.: 460.

Fundamentals of viscous flow, laminar and turbulent boundary layers, aerodynamic heating, effects of body forces and acceleration, elements of radiative transfer.

**594 U 3-5**  
**Group Studies in Aeronautical and Astronautical Engineering**

A, W, Sp. 3-5 cl.

Prereq.: Permission of dept.

Repeatable to a maximum of 15 cr. hrs.

Special studies in aeronautical and astronautical engineering are undertaken to satisfy various nonrecurring needs for aeronautical and astronautical subject matter outside of the normal course structure of the department.

**673 U G 4**  
**Biological Fluid Mechanics for the Engineer**

Sp. 4 lec.

Prereq.: Elec. E. 670 and Math. 415; or permission of instructor.

Study of pulsatile flows, low Reynolds number flows, turbulence, and separated flow phenomena as they pertain to biological systems and biomedical engineering applications.

**693 U G 2-10**  
**Individual Studies in Advanced Aeronautical and Astronautical Engineering**

Su, A, W, Sp.

Prereq.: Written permission of dept.

Repeatable to a maximum of 15 cr. hrs.

Special studies in aeronautical and astronautical engineering in one or more areas, including aircraft structures, aerodynamics, propulsion, flutter and vibration, and stability and control.

**694 U G 2-10**  
**Group Studies in Aeronautical and Astronautical Engineering**

Su, A, W, Sp.

Prereq.: Written permission of dept.

Repeatable to a maximum of 15 cr. hrs.

Special advanced topics in aeronautical and astronautical engineering with the specific area under consideration announced.

**695 U 1**  
**Senior Seminar**

A. 1 cl.

Prereq.: Aero-Astro. E. senior standing.

**711 U G 2-4**  
**Advanced Aeronautical Laboratory**

W, Sp. 4-8 lab. hrs.

Prereq.: 540 and 550.

The solution of problems in aero-space engineering by experimental methods.

**720†\* U G 4****Stability and Control of Flight Vehicles**

Sp. 4 cl.

Prereq.: 520.

To alternate with 726.

Modern methods of system response analysis, root-locus analysis, and Liapunov stability analysis.

**725 U G 4****Analytical Dynamics of Astronautics**

W. 4 cl.

Prereq.: 520 or equiv.

Satellite orbit analysis and multi-staging of rockets.

**726\* U G 4****Perturbation of Satellite Orbits**

Sp. 4 cl.

Prereq.: 520 or equiv.

To alternate with 720.

General analysis of satellite orbit perturbations; application to several specific cases.

**740†\* U G 4****Thermal Stresses in Aircraft and Missiles**

Sp. 4 cl.

Prereq.: 540.

To alternate with 746.

Theory of thermal stresses, aerodynamic heating and structural effects due to heating.

**745 U G 4****Aeroelasticity I**

W. 4 cl.

Prereq.: 540 and 560.

To alternate with 740.

Dynamic loads analysis of elastic flight vehicles subjected to unsteady airloads.

**746\* U G 4****Aeroelasticity II**

Sp. 4 cl.

Prereq.: 745.

To alternate with 740.

Continuation of 745.

**751 U G 4****Advanced Propulsion**

A. 4 cl.

Prereq.: 550.

Characteristics and performance of air breathing flight vehicle power plants and their components (inlets, turbo-machinery, combustors, and expansion nozzles).

**760 U G 4****Advanced Compressible Flow**

W. 4 cl.

Prereq.: 561 or equiv.

Two-dimensional supersonic flow theories.

**761 U G 4****Advanced Aerodynamics**

Sp. 4 cl.

Prereq.: 760.

Predictions of pressure distributions, forces, and moments of lifting configurations.

**765 U G 4****Fundamentals of Atmospheric Fluid Dynamics**

W. 4 cl.

Prereq.: 570 or permission of instructor.

Advanced level of treatment of basic topics in the dynamics and thermodynamics of atmospheric motion.

**767 U G 4****Selected Problems in Oceanic Circulation**

A. 4 cl.

Prereq.: 570 or permission of instructor.

First course for advanced students interested in the application of fluid mechanical principles to oceanic circulations.

**771 U G 4****Aerodynamics of Viscous Compressible Flows**

Sp. 4 cl.

Prereq.: 460 and 570.

Analysis of laminar and turbulent boundary layers in high speed flows.

**775 U G 4****Hypersonic Flows I**

W. 4 cl.

Prereq.: 561 or 661.

Introduction to the analysis of inviscid hypersonic flow fields.

**800 G 4****Theory of Deformation and Flow**

W. 4 cl.

Prereq.: 460, 540, and 570 or equiv.

Required of all first year graduate students.

General treatment of the basic principles underlying the mechanics of deformable media from both macroscopic and microscopic points of view. Burggraf and Gatewood.

**802 G 4****Analytical Methods in Engineering I**

Sp. 4 cl.

Prereq.: 480, and 561 or equiv.

Advanced methods for solution of partial differential equations with applications to fluid dynamics; topics include Green's functions, method of characteristics, numerical methods, and asymptotic solutions. Burggraf, Gatewood, Li, and Mallett.

**803 G 3****Analytical Methods in Engineering II**

A. 3 cl.

Prereq.: 802.

Continuation of 802 with emphasis on the solution of singular perturbation problems as they arise in fluid mechanics. Burggraf, Gatewood, Li, and Mallett.

**805 G 3****Aerodynamics of Chemically Reacting Fluids**

A. 3 cl.

Prereq.: 405 or equiv.

The aerodynamics of one-dimensional compressible flow with chemical reactions and wave propagation. Edse.

**810 G 3****Flight Vehicle Performance Analysis**

A. 3 cl.

Prereq.: 550 and 761.

Analysis of flight vehicle performance in planetary atmospheres. Gregorek, Lee, Nerem, and Von Eschen.

**815 G 4****Experimental Methods in Aerodynamics**

W. 8 lab.

Prereq.: 510 or permission of instructor.

Repeatable to a maximum of 12 cr. hrs.

Experimental approach to aerodynamics; similarity concepts, facilities, design of experiments, and interpretation of measurements.

**820 G 3****Advanced Flight Vehicle Stability and Control**

A. 3 cl.

Prereq.: 720.

Advanced studies in: stability of systems, non-linear systems, Liapunov method, dynamics in extra-terrestrial atmospheres, new control methods. Mallett.

**825 G 3****Advanced Analytical Dynamics of Astronautics**

W. 3 cl.

Prereq.: 726.

Advanced study in transfer orbits, satellite rendezvous, satellite attitude control, and lunar and planetary missions. Mallett.

**840 G 3****Inelastic Structural Analysis**

A. 3 cl.

Prereq.: 540 or equiv.

The analysis of inelastic space structures and structural components subjected to thermal, uniaxial, and biaxial loads. Bailey and Gatewood.

**841 G 3****Advanced Aeroelasticity**

W. 3 cl.

Prereq.: 746.

The effects of compressibility, three-dimensional flow, and structural heating on the static and dynamic response of elastic and inelastic flight vehicles subjected to steady and unsteady loads. Bailey and Gatewood.

**842 G 3****Advanced Structures for Flight Vehicles**

Sp. 3 cl.

Prereq.: 540 or equiv.

Advanced analysis and design of aircraft structures and/or structural components including thermal, inelastic, and buckling effects. Bailey and Gatewood.

**850 G 3****Non-Equilibrium Flow Dynamics**

A. 3 cl.

Prereq.: 460 or equiv.

Relaxation, dissociation, waves (sound, shock) nozzle flow and design collisional energy transfer in gases. Edse, Li, and Petrie.

**851 G 3****Advanced Propulsion Problems**

W. 3 cl.

Prereq.: 751.

Combustion instability, free radicals as energy source, space propulsion problems, noise of exhaust jets, energy conversion, solid propellants, heat transfer in rocket engines, and cascade theory. Edse.

**852 G 3****Supersonic Combustion**

Sp. 3 cl.

Prereq.: 750.

Hypersonic ramjet, hybrid engines, detonation waves, flame propagation, flame temperature, and combustion kinetics. Edse.

**860 G 3****Advanced High Speed Aerodynamics**

A. 3 cl.

Prereq.: 761.

Supersonic and hypersonic aerodynamics, unsteady aerodynamics, transonic flows, transient wave phenomena, non-equilibrium gas dynamics. Burggraf, Lee, Li, Nerem, Petrie, and Von Eschen.

**861 G 4****Advanced Boundary Layer and Heat Transfer Theory**

W. 4 cl.

Prereq.: 771 and 800; or permission of instructor.

Advanced topics in the areas of boundary layer and heat transfer phenomena. Burggraf, Lee, Li, and Nerem.

**865 G 4****Advanced Viscous Flow Theory**

A. 4 cl.

Prereq.: 771 and 800.

Three-dimensional viscous flow at low and high Reynolds number; stability theory; statistical theories of turbulence. Burggraf, Lee, Li, and Nerem.

**868 G 3****Molecular Theory of Gas Flows**

Sp. 3 cl.

Prereq.: 405, and 800 or equiv.

Molecular theory of flow from the viewpoint of the Boltzmann equation. Burggraf, Edse, Lee, and Petrie.

**870\* G 3****Aerodynamics of Plasmas**

W. 3 cl.

Prereq.: 460, and Elec. E. 810 or equiv.

The governing equations of magnetofluidmechanics, similarity laws, and applications to continuum plasma problems of interest in aerodynamics. Petrie.

**871\* G 3****Aerokinetics of Plasmas**

Sp. 3 cl.

Prereq.: 870.

Wave propagation and magnetohydrodynamic shock waves in multi-component plasma. Petrie.

**876 G 4****Hypersonic Flows II**

Sp. 4 cl.

Prereq.: 771, 775, and permission of instructor.  
Introduction to the study of real gas effects in hypersonics. Lee and Li.

**880 G 1****Seminar**

Su, A, W, Sp. 1 2-hr. cl.

Repeatable to a maximum of 15 cr. hrs. Req'd. of all grad. students in Aero-Astro. E. each qtr.

**889 G 2-5****Advanced Topics in Aeronautical and Astronautical Engineering**

Su, A, W, Sp.

Prereq.: Permission of dept.

Repeatable to a maximum of 15 cr. hrs.

**999 G Arr.****Research in Aeronautical and Astronautical Engineering**

Su, A, W, Sp.

Research for thesis or dissertation purposes only.

## Agricultural Economics

Office: 103 Agricultural Administration Building, 2120 Fyffe Road

**Professors** Boyne (Chairman), McCormick (Associate Chairman), Phillips (Associate Chairman), Adams, R. H. Baker, R. L. Baker, Barr, Baumer, Cravens, Dougan, Ezzell, Hadley, Ingraham, Jacobson, Jones, Mitchell, Moore, Shaudys, Sitterley, Smith, Stout, Walker, and Wayt; **Associate Professors** Bauman, Bowen, Darrow, Erven, Hahn, Himes, Hushak, Marion, McDonald, Rask, Simonds, Taylor, P. R. Thomas, Vandemark, and Wessel; **Assistant Professors** Duvick, Francis, Glover, Henderson, Hitzhusen, Larson, Lee, Meyer, Napier, Singh, D. W. Thomas, and Watkins; **Instructors** Pierce, Pugh, and Tucker.

**100 U 5****Principles of Agricultural Economics**

A, W, Sp. 5 cl.

Not open to students with credit for Econ. 200.

A study of economic principles and their application to problems of agricultural production, demand and supply, marketing systems, consumption, and income distribution in rural economics.

**110 U 5****Socio-Economic Systems in Rural America**

A, W, Sp. 5 cl.

(Crosslisted in the Dept. of Rural Soc.)

A study of our rural socio-economic systems, the individual's interaction within these systems, and the impact of societal decisions on resource use and control. Hitzhusen, Shaudys, and Thomas.

**H199 U 5****Agricultural Economics in a Changing World**

Sp. 5 cl.

Prereq.: Membership in a College honors program or eligibility for membership with permission of instructor.  
Not open to students with credit for 100 or Econ. 200.

A study of basic economic principles as applied to agricultural production, consumption, and marketing problems in a changing world. McCormick.

**250 U 3****Computers in Agricultural Decisions**

W. 3 1-hr. cl.

Prereq.: 100.

Survey of agricultural problem solving, computing systems fundamentals, and the use of computer systems as aids in agricultural decision making. Taylor.

**GENERAL PREREQUISITES FOR COURSES NUMBERED 300 AND 400**

Unless otherwise indicated, the prerequisites for 300 and 400-level courses are 90 cr. hrs. in collegiate courses, exclusive of ROTC and Phys. Ed.; or specified course(s) numbered 100-399.

**310 U 5****Management of Agricultural Firms**

A, W, Sp. 5 1-hr. cl.

Prereq.: 100 or equiv.

Organization and operation of farm and agribusiness firms; economic and management principles in decision making; financial statements, budgeting, firm organization and operation, financial and labor management.

**310.01 Farm Management**

Not open to students with credit for 310.02 or 410.

Erven, Shaudys, and Sitterley.

**310.02 Agribusiness Firm Management**

Not open to students with credit for 310.01 or 540.

Hahn and Taylor.

**312 U 3****Farm Records and Analysis**

A, W. 2 1½-hr. cl.

Prereq.: 100 or equiv.

Nature and need for farm business records and analysis and interpretation of essential records from farm manager viewpoint; their use in income tax reporting. Baker.

**320 U 5****Marketing in Agricultural Industries**

A, W, Sp. 5 cl., 1 1-day field trip.

Prereq.: 100.

The study and analysis of the theory of markets and the market processes and institutions important in the agricultural-related sectors of the U. S. economy.  
R. L. Baker, Henderson, and Simonds.

**416 U 5****Agricultural Finance**

A, Sp. 4 cl., 1 1-day field trip.

Prereq.: 310.01 or 310.02 or equiv.

Financial management of farms and small agribusiness firms; sources of capital, credit institutions, leasing, capital budgeting, leverage, legal aspects, insurance, and financial markets. Lee.

**418 U 3**

**Farm Appraisal**

Sp. 3 cl., 3 3-hr. field trips during qtr.

Prereq.: 310.01 or 310.02 or equiv.

Farm real estate appraisal with emphasis on methods, procedure, and reporting; factors influencing land value and fluctuation in land prices. R. H. Baker.

**GENERAL PREREQUISITES FOR COURSES  
NUMBERED 500**

Unless otherwise indicated, the prerequisites for 500-level courses are 15 cr. hrs. in courses in the same discipline numbered 200 or higher, or 10 cr. hrs. in courses numbered 200 or higher in the same discipline, plus 10 cr. hrs. in courses numbered 200 or higher in specified allied disciplines; or baccalaureate degree.

**502 U G 3**

**Prices of Farm Products**

W, Sp. 3 cl.

Characteristics of agricultural price, movement, measurement, seasonality, cycles, and forecasting, including analysis of price formation elasticity, parity, and other price statistics. Himes.

**507 U G 5**

**Agricultural Economics Analysis**

W. 3 1-hr. cl.

Prereq.: Econ. 442 or Stat. 125.

Application of the scientific method and statistical analysis to problems in Agricultural Economics. Hushak.

**522 U G 3**

**Livestock Marketing**

W. 3 cl.

Prereq.: 320.

(Offered in cooperation with the Dept. of Animal Sc.)

Selling methods, basis of sale, agencies involved, organization of markets, transportation, financing, marketing costs, prices, when to market, grade differentials, government regulation. Stout.

**523 U G 3**

**Grain Marketing**

Su, A. 3 cl.

Prereq.: 320.

Principles and practices involved in grain and feed marketing and the theory of grain pricing; economics of grain marketing.

**526 U G 3**

**Marketing Dairy Products**

W. 3 cl.

Prereq.: 320.

(Offered in cooperation with the Depts. of Dairy Sc. and Food Sc. and Nutrition.)

A study of the principles of assembling, transporting, selling, pricing, distribution, marketing costs, and margin for dairy products. Jacobson.

**528 U G 3**

**Marketing Fruits and Vegetables**

Sp. 3 cl. 1 2-day field trip.

Prereq.: 320.

Principles involved in the marketing of fruits and vegetables and the agencies concerned. Cravens.

**530 U G 5**

**Agricultural Policy**

A, W. 5 cl.

Not open to Juniors.

Characteristics and problems of agriculture; description and analysis of programs and policies designed to assist agriculture and alternative proposals for the future. Glover and Stout.

**531 U G 3**

**Land Economics**

W, Sp. 3 cl.

Land resources and requirements; economic principles involved in land use; major land use problems; ways of achieving better land use; public's interest in land policy. Wayt and Glover.

**532 U G 3**

**The Development of Rural Economic Systems**

A. 3 cl.

Comparison and analysis of systems, problems, and methods of transforming rural structures in less developed and developed countries; implications of international issues for rural development. Wessel.

**534 U G 3**

**Food Economics**

Sp. 3 cl.

Economic aspects of the production, distribution, and consumption of foods. Simonds.

**H539 U G 5**

**U.S. Agricultural Price and Income Policy**

W. 5 cl.

Prereq.: Jr. standing and membership in a College honors program or eligibility for membership with permission of instructor.

Not open to students with credit for 530.

A description, analysis, and evaluation of the United States agricultural price and income programs past, present, and proposals for the future. McCormick.

**541 U G 5**

**Cooperation in Agriculture**

A, Sp. 5 cl.

Basic principles of cooperatives including types of organizations, legal aspects, membership relations, financing, organizational and intercooperative problems, and distribution of savings. Ingraham.

**593 U G 2-5**

**Individual Studies**

Su, A, W, Sp.

H593 (honors) may be available to students enrolled in a college honors program or eligible for enrollment.

Prereq.: Permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

Planning, conducting, and reporting a special problem in agricultural economics to meet the needs of the student.

**593.01 Agribusiness Management**

**593.02 Agricultural Marketing**

**593.03 Agricultural Policy**

**593.04 Foreign Agricultural Development**

**593.05 Resource Economics**

**593.06 Community Resource Development**

**593.07 Agricultural Economic Theory**



- 593.08 Quantitative Methods and Research  
Methodology in Agricultural Economics  
593.09 Unclassified

**594 U G 2-5****Group Studies**

A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

Reporting of selected topics in agricultural economics to further acquaint the student with current conditions.

- 594.01 Agribusiness Management  
594.02 Agricultural Marketing  
594.03 Agricultural Policy  
594.04 Foreign Agricultural Development  
594.05 Resource Economics  
594.06 Community Resource Development  
594.07 Agricultural Economic Theory  
594.08 Quantitative Methods and Research  
Methodology in Agricultural Economics  
594.09 Unclassified

**595 U 1****Senior Seminar in Agricultural Economics**

A, W, Sp. 1 cl.

Prereq.: Senior standing.

An analysis of social and economic problems encountered by the college graduate in a dynamic world. McCormick.

**GENERAL PREREQUISITES FOR COURSES  
NUMBERED 600**

Unless otherwise indicated, the prerequisites for 600-level courses are 15 cr. hrs. in courses in the same discipline numbered 300 or higher, or 10 cr. hrs. in courses numbered 300 or higher in the same discipline, plus 10 cr. hrs. in courses numbered 300 or higher in specified allied disciplines.

**610 U G 5****Farm Organization**

A. 4 cl., 1 2-hr. lab. and 1 field trip during qtr.

Prereq.: 310.01 or 410, 312 or 412; Animal Sc. 200, and Agron. 411 or 412.

Detailed application of production economics, management principles, and decision making techniques to the organization, operation, and administration of farms; farm plans developed. Shaudys.

**620 U G 4****Agri-Industry Organization and Public Policy**

Sp. 2 2-hr. cl.

Prereq.: 20 hrs. in Agr. Ec. and/or Econ. at the 300 level and above.

Analysis of socioeconomic performance in agricultural industries, including the study of interrelationships among market structure, firm conduct, public policy, consumer behavior and performance in the private enterprise sector of the agricultural economy. Baumer, Henderson, and Marion.

**632 U G 3****Economic Techniques  
for Foreign Agricultural Development**

A. 3 cl.

Prereq.: 532 or permission of instructor.

The role of agriculture in economic development, characteristics of traditional agriculture, and the techniques used to modernize agriculture. Adams.

**640 U G 5****Strategy in Agribusiness**

W. 1 1-hr. cl., 2 2-hr. cl.

Prereq.: 320 and 416 or equiv.

Analysis of important management problems confronting agricultural marketing and farm supply firms, including interpreting and responding to industry and socio-economic trends and change forces. Marion.

**693 U G 2-5****Individual Studies**

Su, A, W, Sp.

H693 (honors) may be available to students enrolled in a college honors program or eligible for enrollment.

Prereq.: Permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

Planning, conducting, and reporting a special problem in agricultural economics.

- 693.01 Agribusiness Management  
693.02 Agricultural Marketing  
693.03 Agricultural Policy  
693.04 Foreign Agricultural Development  
693.05 Resource Economics  
693.06 Community Resource Development  
693.07 Agricultural Economic Theory  
693.08 Quantitative Methods and Research  
Methodology in Agricultural Economics  
693.09 Unclassified

**694 U G 2-5****Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

Selected topics in agricultural economics to acquaint students with current economic conditions.

- 694.01 Agribusiness Management  
694.02 Agricultural Marketing  
694.03 Agricultural Policy  
694.04 Foreign Agricultural Development  
694.05 Resource Economics  
694.06 Community Resource Development  
694.07 Agricultural Economic Theory  
694.08 Quantitative Methods and Research  
Methodology in Agricultural Economics  
694.09 Unclassified

**695 U G 3****Seminar in Agricultural Business Management**

A. 3 cl.

Application of business management concepts to agriculture. Hahn and Ingraham.

**GENERAL PREREQUISITES FOR COURSES  
NUMBERED 700**

Unless otherwise indicated, the prerequisites for 700-level courses are 15 cr. hrs. in courses in the same discipline numbered 400 or higher, plus additional specified course(s) numbered 600 or higher.

**705 U G 3****Economics of Agricultural Production**

W. 3 cl.

Prereq.: Economics 501 or 705.

Not open to students with credit for 805.

A critical consideration of economic principles as they apply to production problems in agriculture. Hushak and Walker.

**716 U G 3**

**Agricultural Finance**

Sp. 3 cl.

Prereq.: 416 or 516 and Bus. Admin. 620.

Analysis of capital budgeting and cash flow techniques as related to agricultural finance; evaluation of selected procedures for estimating the repayment capacity. Lee.

**GENERAL PREREQUISITES FOR COURSES  
NUMBERED 800 AND 900**

Unless otherwise indicated, the prerequisites for 800- and 900-level courses are 30 cr. hrs. in courses in the same discipline, or 20 cr. hrs. in the same discipline, plus 25 cr. hrs. in specified allied disciplines.

**800 G 3**

**Research Methods in Agricultural Economics**

Sp. 3 cl.

Prereq.: Econ. 805, 5 cr. hrs. Math., and 4 cr. hrs. statistics.

Principles of scientific method in agricultural economic Hahn, Henderson, Marion, Sharp, Simonds, and Stout.

**801 G 3**

**Seminar in Problems  
in Agricultural Economics Statistics**

A. 3 cl.

Prereq.: Econ. 641.

Application of statistics to problems in agricultural economics. Hushak.

**802 G 3**

**Quantitative Methods in Agricultural Economics**

W. 3 cl.

Prereq.: 800, Econ. 641, and differential calculus.

Applications of analytical models to problems in agricultural economics research. Walker.

**803 G 2**

**Seminar in Linear Programming**

Sp. 2 cl.

Prereq.: 800.

Application of linear programming to agriculture R. H. Baker.

**804 G 3**

**Seminar in Agricultural Price Analysis**

Sp. 3 cl.

Prereq.: 800.

Intensive consideration given to theory and analysis of agricultural prices. Himes.

**806 G 4**

**Economics of Agricultural Production**

Sp. 3 cl.

Prereq.: 705 or 805 and Econ. 705.

A further consideration of economic principles as they apply to production problems in agriculture. Walker and Hushak.

**807 G 2-4**

**Seminar in Agricultural Economic Theory**

Sp.

Prereq.: 705, 800, and permission of instructor.

Repeatable to a maximum of 8 cr. hrs.

**810 G 3**

**Farm Organization and Resource Management**

W. 3 cl.

Prereq.: 610.

Designed to integrate resource use and the human factor under dynamic conditions of risk and uncertainty with a goal of economic progress. Erven and Shaudys.

**811 G 24**

**Seminar in Farm Organization and Management**

W.

Application of micro-theory to farm organization and management.

**816 G 2-4**

**Seminar in Agricultural Finance**

A.

Repeatable to a maximum of 8 cr. hrs.

Intensive consideration is given to current theories and future problems in agricultural finance.

**820 G 3**

**Agricultural Marketing**

W. 3 cl.

Prereq.: 620, Econ. 805, and 806.

Study of the major problems in agricultural marketing and relevant research findings. R. L. Baker, Cravens, Hahn, Henderson, Marion, Sharp, Simonds, and Stout.

**821 G 2-4**

**Seminar in Agricultural Marketing**

A.

Repeatable to a maximum of 8 cr. hrs.

Critical analysis of major problems in agricultural marketing.

**830 G 4**

**Agricultural Policy**

A. 4 cl.

Prereq.: 320 or 420, 530, Econ. 805, and 806.

Examination of values of American society concerning agriculture, reasons for these values, and alternatives for achieving various goals for U.S. agriculture. Glover and Stout.

**831 G 3**

**Land Economics**

Sp. 3 cl.

Prereq.: 531 and 705.

Examination of current problems in land resources use, allocation, conservation, and control. Glover and Wayt.

**832 G 3**

**Seminar in Economic Development  
of Foreign Agriculture**

Sp.

Prereq.: 632

Repeatable to a maximum of 8 cr. hrs.

Characteristic problems of developing countries, identification and analysis of limiting factors in underdevelopment, and techniques for stimulating economic development through growth in agriculture. Adams.

**833 G 2-4****Seminar in Land Tenure, Agrarian Reform, and Agricultural Development**

A.

Repeatable to a maximum of 8 cr. hrs.

Evaluation of land reform, agrarian reform, and land tenure systems; emphasis on parcelization, colonization, parcel consolidation, and taxation. Wayt.

**834 G 2-4****Seminar in Food Economics**

A.

An examination of the economic relationship of food production to population and region of the world and areas within countries. Simonds.

**897 G 1****Interdepartmental Seminar in Natural Resources**

A, W, Sp.

(See under Interdepartmental Seminars.)

**899 G 1-5****Interdepartmental Seminars**

A, W, Sp.

(See under Interdepartmental Seminars.)

**993 G 2-5****Individual Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

Planning, conducting, and reporting a special problem in agricultural economics fitting the needs of the student, under the guidance of an instructor.

**993.01 Agribusiness Management****993.02 Agricultural Marketing****993.03 Agricultural Policy****993.04 Foreign Agricultural Development****993.05 Resource Economics****993.06 Community Resource Development****993.07 Agricultural Economic Theory****993.08 Quantitative Methods and Research Methodology in Agricultural Economics****993.09 Unclassified****995 G 2 or 4****Seminar**

A, W, Sp.

Repeatable to a maximum of 10 cr. hrs.

**999 G Arr.****Research in Agricultural Economics**

Su, A, W, Sp.

Research for thesis or dissertation purposes only.

## Agricultural Education

Office: 208 Agricultural Administration Building, 2120 Fyffe Road.

**Professors** Bender (Chairman), Boucher, Cunningham, Gehres, Guiler, Halterman, Johnson, McCormick, Ritchie, Taylor, Warmbrod, Watson, Wilson, Wolf, and Woodin; **Associate Professors** Bruny, Garrison, Hull, Jenkins, Magisos, Robinson, Schroeder, and Starling; **Assistant Professors** Budke, Geyer, Gray, Koble, Lau, Leidheiser, Lifer, McCaslin, McCracken, Norton, Oren, Waliser, C. Young, and R. Young; **Instructors** Archer and Pulse.

**200 U 3****Introduction to Agricultural Education**

A, W, Sp. 3 cl.

Importance and purpose of agricultural education with emphasis on nature of programs, career opportunities, and qualifications of personnel as related to school and society. Boucher.

**280 U 2-5****Experience in Agricultural Education**

Prereq.: 200.

Not open to students with credit for 380.

Repeatable to a maximum of 10 cr. hrs.

Supervised field experience in:

**280.01 Teaching of Agriculture**

A (During Sept.), W, Sp.

Participation in professional activities relating to problems, methods, and skills basic to agricultural education. Wilson and Boucher.

**280.02 Cooperative Extension**

Su, A, W, Sp.

Participation in programmed experience involving Cooperative Extension responsibilities. Jenkins and Young.

**280.03 Specially Programmed Experience**

Su, A, W, Sp.

Participation in programmed experience involving vocational agriculture or other appropriate areas of agricultural education.

**290 U 3****Communication of Agricultural Concepts**

A, W, Sp. 2 1½-hr. cl.

Prereq.: Engl. 100.

Procedures and practice in developing, interpreting, and communicating agricultural and natural resources concepts with emphasis upon the use of visual materials and effective presentation.

**330 U 5****Methods in Teaching Vocational Agriculture**

A, W, Sp. 4 cl., 4 lab. hrs.

Prereq.: 200 and 280.01.

Not open to students with credit for 230.

Principles of teaching and the learning process with application to teaching vocational agriculture including laboratory study in selected schools. Wolf.

**420 U 3**  
**Program Development in Cooperative Extension**

Sp. 3 cl.  
Prereq.: 200.

Principles and procedures in developing extension programs in agriculture and home economics, with emphasis on program determination, teaching methods, and relationships with other groups. Jenkins.

**GENERAL PREREQUISITES FOR COURSES  
NUMBERED 500**

Unless otherwise indicated, the prerequisites for 500-level courses are 15 cr. hrs. in courses in the same discipline numbered 200 or higher, or 10 cr. hrs. in courses numbered 200 or higher in the same discipline, plus 10 cr. hrs. in courses numbered 200 or higher in specified allied disciplines; or baccalaureate degree.

**581 U 5**  
**Student Teaching in Agriculture**

A, W, Sp.  
Prereq.: 330 and completion of departmental requirements for admission to the professional program; concur. 582 and 583.

Supervised participation in teaching and other professional responsibilities of teachers of agriculture including clinical analysis in conferences and seminars. Wilson and Boucher.

**582 U 5**  
**Student Teaching in Agriculture**

A, W, Sp.  
Concur.: 581 and 583.

Supervised participation in teaching and other professional responsibilities of teachers of agriculture including clinical analysis in conferences and seminars. Wilson and Young.

**583 U 5**  
**Student Teaching in Agriculture**

A, W, Sp.  
Concur.: 581 and 582.

Supervised participation in teaching and other professional responsibilities of teachers of agriculture including clinical analysis in conferences and seminars. Boucher.

**GENERAL PREREQUISITES FOR COURSES  
NUMBERED 600**

Unless otherwise indicated, the prerequisites for 600-level courses are 15 cr. hrs. in courses in the same discipline numbered 300 or higher, or 10 cr. hrs. in courses numbered 300 or higher in the same discipline; plus 10 cr. hrs. in courses numbered 300 or higher in specified allied disciplines.

**621 U G 3**  
**Curriculum Development**

Su (1st term). 3 2-hr. cl.  
Prereq.: 581, 582, and 583.

Principles and practices used in developing courses of study in agriculture for high school and post-high school programs. Guiler.

**622 U G 3**  
**Continuing Education in Agriculture**

Sp. 1 3-hr. cl.  
Prereq.: 581, 582, and 583.

Principles and practices involved in developing vocational, technical, and extension programs for out-of-school youth and adults. Bender and Boucher.

**631 U G 3**  
**Methods in Teaching Agriculture**

Su (1st term), W. 2 1½-hr. cl.  
Prereq.: 581, 582, and 583.

Theory, principles, and procedures associated with effective instruction in agriculture at the secondary, technical, and college levels. Bender.

**640 U G 3**  
**Instructional Media in Teaching Agriculture**

Su, Sp. 1 3-hr. cl.  
Prereq.: 581, 582, and 583.

Theory and practice in developing and using instructional media and equipment at the secondary, technical, and college levels. Guiler and Woodin.

**641 U G 3**  
**Occupational Experience in Agricultural Education**

A, Sp. 1 3-hr. cl.  
Prereq.: 581, 582, and 583.

Principles and procedures used in selecting, planning, conducting, and evaluating occupational experience programs for students. Guiler and Woodin.

**642 U G 3**  
**Youth Organizations**

Sp. 1 3-hr. cl.  
Prereq.: 581, 582, and 583.

An analysis of youth organizations in vocational and extension education with emphasis on planning and conducting such programs. Bender and Boucher.

**684 U G 3-15**  
**Internship in Agricultural Education**

Su, A, W, Sp.  
Prereq.: 581, 582, and 583.

Repeatable to a maximum of 15 cr. hrs.

Guided participation to further enhance professional and/or technical competency in selected areas. Guiler.

**684.10 Vocational Agriculture**

Su, A, W, Sp.

**684.20 Cooperative Extension Education**

Su, A, W, Sp.

**684.30 Technical**

Su, A, W, Sp.

**684.40 Specialized Agriculture**

Su, A, W, Sp.

**693 U G 2-5**  
**Individual Studies**

Su, A, W, Sp.

H693 (honors) may be available to students enrolled in a college honors program or eligible for enrollment.

Planning, conducting, and reporting a special study appropriate to the needs of the student.

GENERAL PREREQUISITES FOR COURSES  
NUMBERED 700

Unless otherwise indicated, the prerequisites for 700-level courses are 15 cr. hrs. in courses in the same discipline numbered 400 or higher, plus additional specified course(s) numbered 600 or higher.

**743 U G 3****Practicum in Teaching Agricultural Mechanics**

W. 1 4-hr. cl.

Prereq.: 621, 631, or 684.

Selection and use of subject matter, resources, and methods of teaching agricultural mechanics. Johnson.

**744 U G 3****Practicum in Teaching Farm Business Planning**

A. 1 3-hr. cl.

Prereq.: 621, 631, or 684.

Methods of teaching farm business planning, including the selection of subject matter and use of resources, with application to high school and continuing education programs. Starling.

**770 U G 3****Evaluation**

Sp. 1 3-hr. cl.

Prereq.: 621, 631, or 684.

Evaluation principles and procedures used in developing vocational, technical, and extension programs. Woodin.

**790 U G 3-5****Workshops in Agricultural Education**

Minimum of 3 wks.

Prereq.: Teaching or extension experience and permission of instructor.

A maximum of 10 cr. hrs. may be earned in any one decimal subdivision; or 15 cr. hrs. in any combination of decimal subdivisions.

Intensive study of selected areas of agricultural education with emphasis on the application of principles and methods in attaining desired objectives.

**790.10 General**

Su.

**790.11 Agricultural Production**

Su.

**790.12 Agricultural Business, Supplies, and Services**

Su.

**790.13 Agricultural Equipment and Mechanics**

Su.

**790.14 Agricultural Products and Processing**

Su.

**790.15 Ornamental Horticulture**

Su.

**790.16 Agricultural Resource Conservation**

Su.

**790.17 Forestry**

Su.

**790.20 Cooperating Instructors**

Su.

**790.21 Supervisors**

Su.

**790.22 Technical School Instructors**

Su.

**790.23 Continuing Education Teachers**

Su.

**790.24 Teachers with Special Certificates**

Su.

**790.25 Teachers of Disadvantaged Youth**

Su.

**794 U G 3 or 5****Group Studies**

A, W, Sp. 1 3-hr. cl.

Prereq.: Teaching or extension experience.

Repeatable to a maximum of 10 cr. hrs.

An intensive study of a selected area in agricultural education appropriate to the needs of the group not provided in other courses. Cunningham.

**795 U G 1-3****Seminar**

Su, A, W, Sp. 1- or 2-hr. cl.

Prereq.: Permission of instructor.

**795.01 Contemporary Programs**

A.

**795.02 Problems and Issues**

W.

**795.03 Leadership Development**

A, Sp.

**795.04 Program Development**

A.

**795.05 Research and Evaluation**

A, W.

**795.06 Communication**

Sp.

GENERAL PREREQUISITES FOR COURSES  
NUMBERED 800 AND 900

Unless otherwise indicated, the prerequisites for 800 and 900-level courses are 30 cr. hrs. in courses in the same discipline, or 20 cr. hrs. in the same discipline, plus 25 cr. hrs. in specified allied disciplines.

**810 G 3****Principles of Vocational-Technical Education**

A. 1 3-hr. cl.

Prereq.: Professional experience in vocational education.

An analysis of evolving concepts of vocational and technical education with emphasis upon principles underlying organization and practice. Woodin.

**811 G 3****Administration and Supervision**

Su (2nd term), A. 1 3-hr. cl.

Prereq.: Experience in Agr. Ed.

Principles in developing and administering programs in vocational, technical, and extension education with attention to federal-state-local relationships, in-service education, and supervisory procedures. McCormick and Taylor.

**812 G 3****Teacher Education**

Su (2nd term). 5 cl.

Prereq.: Experience in Agr. Ed.

Principles and methods of teacher education in agriculture including selection and guidance of students, curriculum, field experience, placement, in-service education, and research. Wilson.

**823 G 3**

**Program Planning and Development**

Su (1st term). W. 1 3-hr. cl.

Prereq.: Experience in Agr. Ed.

Principles, theory, and practice in developing state and local programs of vocational, technical, and extension education. Cunningham, Taylor, and Woodin.

**885 G 3**

**Research Methods**

Su (1st term). 5 cl.; W. 1 3-hr. cl.

Prereq.: 6 cr. hrs. grad. courses.

Principles and techniques of research appropriate for planning, conducting, and reporting research in vocational, technical, and extension education. Warmbrod.

**886 G 3**

**Research Design**

Sp. 2 1½-hr. cl.

Prereq.: 885 and a course in Statistics.

Development of effective design for research problems in vocational, technical, and extension education, including theory, models, and sampling.

**887 G 3**

**Analysis and Interpretation of Data**

A. 1 2½-hr. cl.

Prereq.: 886 or permission of instructor.

Application and interpretation of descriptive and inferential statistics for research in vocational-technical and extension education, including the use of the computer. Cunningham and Warmbrod.

**889 G 3**

**Advanced Studies**

Su, A, W, Sp.

Prereq.: 885.

Individual field study in partial fulfillment of needs for research experience.

**899 G 2 or 3**

**Interdepartmental Seminar**

W, Sp. 1 or 2 cl.

Investigation and analysis of current problems and issues in cooperation with other appropriate departments.

**995 G 1-3**

**Seminar in Research**

Su. 1 3-hr. cl.

Prereq.: 886.

Repeatable to a maximum of 3 cr. hrs.

Further development and direction of individual studies and programs of research. Warmbrod and Young.

**999 G Arr.**

**Research**

Su, A, W, Sp.

Research for thesis or dissertation purposes only.

# Agricultural Engineering

Office: 105 Ives Hall, 2073 Neil Avenue

**Professors** Nelson (Chairman), Roller (Associate Chairman, Wooster), Barre, Blickle, Bondurant, Brazee, Byg, Curry, Harrold, Herum, Huber, Johnson, Palmer, Reeve, Schwab, Stuckey, and Taiganides; **Associate Professors** Blaisdell, Drew, Gill, Hamdy, Miller, and Schnug; **Assistant Professors** Belt, Fox, Henry, Nolte, Short, Stombaugh, White, and Witz; **Instructors** Fausey, Harkness, Keener, and Walker.

**GENERAL PREREQUISITES FOR COURSES  
NUMBERED 200**

Unless otherwise indicated, the prerequisites for 200-level courses are 45 cr. hrs. in collegiate courses, exclusive of ROTC and Phys. Ed.; or specified course(s) numbered 100-199.

**210 U 5**

**Engineering in Agriculture**

A, W, Sp. 4 cl., 1 2-hr. lab.

Basic concepts of engineering and technology essential to the development and function of improved systems for fulfilling our food and agricultural environment needs. Harkness.

**220 U 3**

**Buildings and Equipment  
for Farmstead Operations**

A, Sp. 2 cl., 2 lab. hrs.

Prereq.: Math. 117, 121, or 150.

Functional requirements and planning of buildings and facilities for livestock production and for conditioning and storage of crops; environmental control; building construction. Barre.

**221 U 3**

**Agricultural Materials Handling Systems**

W. 2 cl., 2 lab. hrs.

Prereq.: Math. 117, 121, or 150.

Principles, functional analysis and design of agricultural materials handling systems from harvest to utilization. Herum.

**223 U 2**

**Introduction to Agricultural Engineering Design**

A. 1 3-hr., 1 2-hr. lab.

Prereq.: Physics 132.

Open only to Agr. E. majors.

Principles of engineering design, emphasizing biological concepts of importance in agricultural production and processing. Harkness.

**230 U 3**

**Power for Agricultural Operations**

A, W, Sp. 2 cl., 2 lab. hrs.

Prereq.: Math. 117, 121, or 150.

A study of power in agriculture with primary emphasis upon power needs for field operations, characteristics of available power sources, selection, and use of power units. Huber.

**231 U 3**  
**Electric Power for Agricultural Operations**

W. 2 cl., 2 lab. hrs.

Prereq.: Math. 117, 121, or 150.

Functional analysis of systems and components essential for distribution and control of electricity for power, heat, and illumination applications in agriculture. Harkness.

**240 U 3**  
**Teaching of Agricultural Construction and Maintenance**

A, W, Sp. 2 cl., 6 lab. hrs.

Prereq. or concur.: Agr. Ed. 230 or 330.

Principles and methods of teaching selection, use, and care of hand and power tools, materials for wood and metal construction based upon farm needs. C. Johnson.

**250 U 3**  
**Machines for Agricultural Operations**

A, Sp. 2 cl., 2 lab. hrs.

Prereq.: Math. 117, 121, or 150.

Analysis of field machine operations with emphasis on recognition and quantitative solution of problems in selection and use of machines for optimum economic performance. Harkness.

**270 U 3**  
**Engineering Methods in Soil and Water Conservation**

A, Sp. 2 cl., 3 lab. hrs.

Prereq.: Math. 117, 121, or 150, and Agron. 240.

Instrument surveying, aerial and topographic maps, rainfall and runoff, and engineering applications of soil and water management on farms and on recreational areas. Schwab and Taiganides.

**GENERAL PREREQUISITES FOR COURSES  
 NUMBERED 300 AND 400**

Unless otherwise indicated, the prerequisites for 300 and 400-level courses are 90 cr. hrs. in collegiate courses, exclusive of ROTC and Phys. Ed.; or specified course(s) numbered 100-399.

**305 U 3**  
**Rural Housing Technology**

A, Sp. 3 cl.

Prereq.: 3rd yr. standing or permission of instructor.

Basic technological factors of rural housing; site selection, drainage, water supply, waste disposal, utilities, and basic construction methods. Miller.

**310 U 5**  
**Fundamentals of Food Engineering**

A. 3 cl., 2 2-hr. lab.

Prereq.: 10 cr. hrs. in Math., 10 cr. hrs. in Chem., and 5 cr. hrs. in Physics.

(Offered in cooperation with the Dept. of Food Science and Nutrition.)

Introduction to heat transfer, fluid flow, and thermodynamics in food processes. Blaisdell.

**411 U 5**  
**Refrigeration Engineering in the Food Industry**

Sp. 3 cl., 2 2-hr. lab.

Prereq.: 310.

(Offered in cooperation with the Dept. of Food Science and Nutrition.)

Transient heat transfer, thermodynamics of refrigeration systems, and applications of refrigeration in food processing. Blaisdell.

**425 U 3**  
**Engineering Properties of Biological Materials**

A. 2 cl., 1 2-hr. lab.

Prereq.: Chem. 204 and Engr. Mech. 420, or permission of instructor.

Identification and measurement of the physical properties of agricultural materials relevant to the engineering of systems for their production, harvesting, handling, and classification. Blaisdell and Herum.

**433 U 3**  
**Analysis of Elementary Biological-Physical Systems**

W. 3 cl., 1 1-hr. lab.

Prereq.: Math. 255 and Engr. Mech. 410; or equiv.

Mathematical model formulation and analysis techniques developed and applied to elementary biological and physical systems. Hamdy.

**434 U 3**  
**Biometeorology of Plant and Animal Systems**

W. 3 cl.

Prereq.: 223.

Study of the micro- and macro-environmental variables in nature as they relate to engineering of plant and animal production systems. Schwab.

**GENERAL PREREQUISITES FOR COURSES  
 NUMBERED 500**

Unless otherwise indicated, the prerequisites for 500-level courses are 15 cr. hrs. in courses in the same discipline numbered 200 or higher, or 10 cr. hrs. in courses numbered 200 or higher in the same discipline, plus 10 cr. hrs. in courses numbered 200 or higher in specified allied disciplines; or baccalaureate degree.

**500 U G 1**  
**Farm and Home Safety**

Sp. 1 cl.

Causes of accidents; methods for conducting farm and home safety programs; for students interested in vocational agriculture, extension, and farm organization work.

**535 U G 4**  
**Utilization of Energy in Agriculture**

Sp. 3 cl., 1 2-hr. lab.

Prereq.: 433 and Mech. E. 501.

Study of motive and stationary power needs of agriculture, mechanics of traction, characteristics of power sources, morphology of off-the-road vehicle design. Huber.

**543 U G 5**  
**Engineering Soil-Water Management**

A. 3 cl., 2 3-hr. lab.

Prereq.: 434, Agron. 671, and Civil E. 413, or equiv.

Engineering design of drainage, irrigation, and erosion control systems for optimum crop growth, environment, and related water storage structures. Schwab.

**544 U G 4**  
**Engineering Agricultural Machines**

A. 3 cl., 1 3-hr. lab.

Prereq.: 535 and Mech. E. 350.

Design of agricultural machines; recognition of the economic, political, and social context in which the machinery is designed, built, distributed, and used.

**550 U G 3**  
**Pollution Control and Waste Utilization**

Su, W, Sp. 3 cl.

Prereq.: Upper division or grad. standing.

Not open for graduate credit to students majoring in Agr. E.

Management and utilization of animal wastes, fertilizers, pesticides, crop residues, milk and food processing and farmstead and urban solid wastes to abate environmental pollution at the urban-rural interface. Taiganides and White.

**551 U G 3**  
**Advanced Farm Power and Field Machinery**

A. 2 cl., 1 3-hr. lab.

Prereq.: 9 cr. hrs. Agr. E., 8 cr. hrs. Agron., or baccalaureate degree.

An advanced study of harvesting machines and power units from the mechanical, operational, and economic standpoint; emphasis is given to the development of optimum harvest systems.

**570 U G 3**  
**Agricultural and Forest Hydrology**

A, W. 3 cl.

Prereq.: 4th yr. standing and permission of instructor.

Not open for credit to students majoring in Agr. E.

Hydrology of small watersheds as influenced by watershed management practices; water resource development; control of sediment and floods; and water quality and conservation. Bondurant and Schwab.

**591 U G 3**  
**Workshop**

Su (1st term). First 3 wks.—full time.

Prereq.: 9 cr. hrs. Agr. E. and permission of instructor.

Principles, objectives, methods, and equipment in the organization and management of a program for teaching agricultural mechanics; students will plan, present, and evaluate units of instruction.

a. Agricultural Mechanics. Johnson.

**593 U G 3-5**  
**Individual Studies**

Su, A, W, Sp.

H593 (honors) may be available to students enrolled in a college honors program or eligible for enrollment.

Prereq.: Permission of instructor.

Advanced study of problems not included in regular courses of this department.

**594 U G 3-5**  
**Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to maximum of 18 cr. hrs.

Intensive study of selected areas in agricultural engineering not provided in other courses and appropriate to the needs of the students.

**GENERAL PREREQUISITES FOR COURSES  
NUMBERED 600**

Unless otherwise indicated, the prerequisites for 600-level courses are 15 cr. hrs. in courses in the same discipline numbered 300 or higher, or 10 cr. hrs. in courses numbered 300 or higher in the same discipline, plus 10 cr. hrs. in courses numbered 300 or higher in specified allied disciplines.

**611\* U G 5**  
**Food Engineering Design and Control**

W. 3 cl., 2 2-hr. lab.

Prereq.: 310, 411, and Animal Sc. 650 or Food Science and Nutrition 637 or Home Ec. 615 or Hort. 441.

(Offered in cooperation with the Dept. of Food Science and Nutrition.)

Integration of economic principles, food sciences, and engineering in optimum design and control of processing systems. Blaisdell.

**645 U G 4**  
**Environmental Engineering  
of Agricultural Structures**

W. 4 cl.

Prereq.: 434.

Functional requirements and principles involved in housing animals and crops; analysis of factors and properties affecting energy exchanges with the environment. Barre.

**646 U G 4**  
**Engineering Agricultural Processing Systems**

W. 3 cl., 1 3-hr. lab.

Prereq.: 425, 433, Civil E. 413, and Mech. E. 501.

Design of systems for processing agricultural food, feed, and fiber, utilizing principles of biodynamics, transient diffusion, turbulent and non-ideal transport, and particulate handling. Blaisdell and Herum.

**647 U G 4**  
**Engineering Agricultural Systems**

Sp. 4 cl.

Prereq.: 543, 544, 645, 646, and Genetics 650; or equiv.

Integration of engineering and biological principles in agriculture to optimize complete operational production systems; application of relevant theory to present and future systems. Barre.

**657\* U G 4**  
**Soil Machine Dynamics in Plant Environment**

Sp. 3 cl., 1 3-hr. lab.

Prereq.: Agron. 240 or 671, Bot. 430, Eng. Mech. 410 or permission of instructor.

Soil dynamics in relation to plant environment and agricultural machine design.

**681 U G 5**  
**Analog Simulation**

A. 3 cl., 2 2-hr. lab.

Prereq.: 433 or equiv.

Principles of analog and hybrid simulation developed and applied to engineering problems in agricultural systems. Hamdy.



**693 U G 3 or 5****Individual Studies**

Su, A, W, Sp.

Prereq.: 15 cr. hrs. of 300-level or higher Agr. E. courses and permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

Work on problems that are not included in regular courses; practice in development, organization, solution, and report on problems of student's choosing.

**694 U G 3-5****Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

Advanced studies in agricultural engineering with principal emphasis on design; work may be elected in the following general areas:

- Machinery
- Light Structures
- Processing
- Soil-Water Management

**695 U G 1****Professional Development**

W. 1 cl.

Prereq.: 3rd yr. standing in Agr. E.

Needs and programs for professional development in engineering related to food and agriculture; opportunities for professional advancement, engineering ethics, and responsibilities to society. Nelson.

**GENERAL PREREQUISITES FOR COURSES  
NUMBERED 700**

Unless otherwise indicated, the prerequisites for 700-level courses are 15 cr. hrs. in courses in the same discipline numbered 400 or higher, plus additional specified course(s) numbered 600 or higher.

**714 U G 5****Environmental Pollution Abatement**

W. 5 cl.

Prereq.: Senior or grad. majors in engineering or sciences.

(Cross-Listed in Civil E., Chem. E., Met. E.)

Problems, philosophies, principles, and methods of pollution abatement in the total environment; quantitative approaches to waste management in air, water, and land systems. Taiganides.

**750 U G 3****Design of Waste Management Systems**

Sp. 2 cl., 1 3-hr. lab.

Prereq.: Senior standing in engineering, or 714, or permission of instructor.

Application of bioengineering principles of pollution control to the design of management systems for wastes from food and fiber production, storage, and processing operations. Taiganides and White.

**794 U G 3****Group Studies**

Su, A, W, Sp. 3 cl.

Prereq.: 15 cr. hrs. of 400 level or higher Agr. E. courses and permission of instructor.

Repeatable to a maximum of 9 cr. hrs.

Advanced subjects in agricultural engineering; course content to be announced in previous quarter.

A. Farm Structures.

Sp. Power and machinery.

**GENERAL PREREQUISITES FOR COURSES  
NUMBERED 800 AND 900**

Unless otherwise indicated, the prerequisites for 800 and 900-level courses are 30 cr. hrs. in courses in the same discipline, or 20 cr. hrs. in the same discipline, plus 25 cr. hrs. in specified allied disciplines.

**808†\* G 3****Measurement in Agricultural Engineering**

W. 3 cl.

Prereq.: 681, Math. 512, and permission of instructor.

Theory and principles involved in measurement and control of biophysical processes in agricultural engineering. Drew.

**850 G 1****Seminar**

A, W, Sp. 1 cl.

Repeatable to a maximum of 6 cr. hrs.

Schwab.

**858\* G 5****Turbulent Diffusion of Aerosols**

A. 5 cl.

Prereq.: Math. 704 and permission of instructor.

Dispersion of particles in turbulence; introduction of statistical theory of turbulence; measurement of fluid flow and turbulence; applications. Braze.

**877†\* G 3****Advanced Agricultural Drainage**

W. 3 cl.

Prereq.: 543 and Math. 512.

Theory of agricultural drainage, both tile and surface methods; measurements of drainage and frequency analysis; hydrologic characteristics of drainage systems; drainage requirements of crops. Schwab.

**897 G 1****Interdepartmental Seminar in Natural Resources**

(See under Interdepartmental Seminars.)

**999 G Arr.****Research**

Su, A, W, Sp.

Research for thesis and dissertation purposes only.

## Agriculture

101 U 1

### Agriculture College Orientation

A, W. 1 cl.

Not open to students with credit for UVC 100.

Orientation to the University and College; exploration of curricula, opportunities, and services. Ritchie.

#### GENERAL PREREQUISITES FOR COURSES NUMBERED 300 AND 400

Unless otherwise indicated, the prerequisites for 300 and 400-level courses are 90 cr. hrs. in collegiate courses, exclusive of ROTC and Phys. Ed.; or specified course(s) numbered 100-399.

351 U 1

### Agricultural Employment

A, W. 1 cl.

Discussion conducted by outside speakers and instructor related to career opportunities, recruitment-placement techniques, interviews, job offer evaluations, and transition from campus. Darrow.

H590 U 2

### Agriculture Honors Colloquium

A, W. 2 cl.

Prereq.: Enrollment in Agriculture Honors Program.

Repeatable to a maximum of 4 cr. hrs.

The relationships of technology, science, and economics in agriculture to society; discussions are led by faculty members or outside speakers. Ritchie.

695 U G 2-5

### Seminar

Su, W.

Prereq.: Permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

The underlying philosophy and principles for developing, organizing, and administering land-grant type institutions and related agencies of Agriculture, Home Economics, and Natural Resources. Smith and Parsons.

## Agronomy

Offices: 108 Townshend Hall, 1885 Neil Avenue; 101 Lazenby Hall, 1827 Neil Avenue

**Professors** Volk (Chairman), Arscott, Bendixen, Clark, Clements, Davis, Dollinger, Findley, Franklin, Friday, Gist, Haghir, Henderlong, Herr, Himes, Hoff, Holowaychuk, Lafever, McLean, Mederski, R. H. Miller, R. W. Miller, Musgrave, Niehaus, Parsons, Ray (Assistant Chairman), Ryder, B. Schmidt (Associate Chairman, Wooster), Shepherd, Smith, Stroube, Sutton, Taylor, Teater, Triplett, VanDoren, VanKeuren, Wilding, Yamazaki, and Yoder; **Associate Professors** Bone, Everett, Hall, Heft, W. Schmidt, Vimmerstedt, Waldron, and Wells; **Assistant Professors** Barta, Derickson, Follett, Goettmoeller, Hopper, Jeffers, Logan, Smeck, Streeter, and Trierweiler; **Instructors** Fausey, Myers, and Wilson.

#### GENERAL PREREQUISITES FOR COURSES NUMBERED 200

Unless otherwise indicated, the prerequisites for 200-level courses are 45 cr. hrs. in collegiate courses, exclusive of ROTC and Phys. Ed.; or specified course(s) numbered 100-199.

200 U 5

### Plant Science in Agriculture

Su, A, W, Sp. 5 cl.

Prereq.: Biol. 100.

(Offered in cooperation with the Dept. of Hort.)

Study of environment and genetic factors that influence plant growth, and how man can alter these factors to produce plants which more adequately meet his needs. Alban, Geisman, Hartman, and Herr.

240 U 5

### Soil Science

Su, A, W, Sp. 3 cl., 2 2-hr. lab.

Prereq.: Chem. 101 and 102, or 121 and 122, or equiv.

Introduction to the genetic, physical, chemical, and biological properties influencing soil productivity; laboratory exercises include observation and quantitative determination of certain of these soil properties. Himes.

### Plants and Man

(See Horticulture H299)

(Offered in cooperation with the Department of Horticulture.)

#### GENERAL PREREQUISITES FOR COURSES NUMBERED 300 AND 400

Unless otherwise indicated, the prerequisites for 300 and 400-level courses are 90 cr. hrs. in collegiate courses, exclusive of ROTC and Phys. Ed.; or specified course(s) numbered 100-399.

411 U 4

### Grain Crops

A, W. 3 cl., 1 2-hr. lab.

Prereq.: 200 or junior standing.

A study of the grain crops, their classification, geographic distribution, culture, varieties, improvement, seed production, harvesting, handling, recognition, grading, and utilization. Ray.

412 U 4

### Forage Crops

A, W, Sp. 3 cl., 1 2-hr. lab.

Prereq.: 200 or junior standing.

Principles underlying characteristics, tolerances, requirements, uses; production of forage plants for hay, pasture, silage, soilage, and cover.

413 U 4

### Principles of Turfgrass Selection and Management

Sp. 4 cl.

Prereq.: 200 or 240.

Adaption, identification, uses, growth characteristics, growth responses, and fundamental principles essential to the production of quality turf. Miller.

**422 U 4****Weed Control**

A, Sp. 3 cl., 1 2-hr. lab.

Prereq.: 200.

A study of weeds, their identification, reproduction, and methods of control; emphasis on various aspects of chemical control measures. Herr.

**441 U 4****Soil Erosion and Its Control**

A. 3 cl., 1 3-hr. lab.

Prereq.: 240.

A study of the mechanics of soil erosion and its control; field trips to observe erosion and conservation practices are included. Hoff.

**442 U 3****Soil Management**

A. 3 cl.

Prereq.: 240.

An integrated study of fertility, tillage, erosion control, and water management in maintaining soil productivity. Hoff.

**GENERAL PREREQUISITES FOR COURSES  
NUMBERED 500**

Unless otherwise indicated, the prerequisites for 500-level courses are 15 cr. hrs. in courses in the same discipline numbered 200 or higher, or 10 cr. hrs. in courses numbered 200 or higher in the same discipline, plus 10 cr. hrs. in courses numbered 200 or higher in specified allied disciplines; or baccalaureate degree.

**510 U G 5****Crop Production in Developing Countries**

W. 5 cl.

Prereq.: 200, 240 or equiv.

Fundamental studies of field and plantation crops in tropical and subtropical countries with emphasis on means and techniques for obtaining production increases. Arscott.

**530 U G 4****Field Crop Breeding**

W. 3 cl., 1 2-hr. lab.

Prereq.: 200, and 411 or 412, and Genetics 500, or equiv.

Principles of genetics and methods of plant breeding applied to the improvement of field crops and the ultimate development of superior varieties. Smith.

**550 U G 5****Pedology and Edaphology**

Sp. 3 cl., 1 4-hr. lab. and field trips.

Prereq.: 200, 240 and 441 or 442.

A comprehensive study of soil with respect to its components, morphology, and genesis and how morphology influences soil behavior especially as it pertains to Ohio conditions. Hall.

**589† U G 5****Field Work**

Su. 3-week field trip.

Prereq.: Permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

A field trip to the major crop, soil, and climatic regions east or west of the Mississippi River in the U.S. and to the major industries that utilize crops.

**593 U G 3 or 5****Individual Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

Students may select special agronomic problems, not included in regular courses and involving library, laboratory, or field studies.

**594 U G 3 or 5****Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

Discussion of selected topics in crop science and/or soil science.

**595 U 2****Undergraduate Seminar**

A, W, Sp. 2 cl.

Prereq.: 15 cr. hrs. in Agron. and 3rd or 4th yr. standing in Agron.

Review and interpretation of research publications and study of functions of agronomic industries.

**GENERAL PREREQUISITES FOR COURSES  
NUMBERED 600**

Unless otherwise indicated, the prerequisites for 600-level courses are 15 cr. hrs. in courses in the same discipline numbered 300 or higher, or 10 cr. hrs. in courses numbered 300 or higher in the same discipline, plus 10 cr. hrs. in courses numbered 300 or higher in specified allied disciplines.

**602 U G 3****Field Crop Ecology**

Sp. 3 cl.

Prereq.: 10 cr. hrs. of crops courses and 5 cr. hrs. of soils courses at the 300 level or higher.

A study of the relationship of crop plants to climate, soils, and other limiting factors of distribution, production, and quality. Bendixen.

**612 U G 4****Principles of Grassland Management**

Sp. 4 cl., 1 4-day field trip.

Plant-animal requirements and correlations in the maintenance, management, and utilization of meadows, pastures, and ranges.

**621 U G 3****Crop Physiology and Production**

A, W. 3 cl.

Prereq.: Bot. 430 and 431, or equiv.

A study of the physiological aspects of crop growth and how they relate to various cultural practices; main emphasis will be on corn and soybeans. Henderlong.

**623 U G 4****Principles of Turfgrass Management**

Sp. 4 cl.

Prereq.: 413, Bot. 430 and 431.

A study of the relationship between basic factors influencing turfgrass growth and the practical execution of maintenance practices which affect the production of quality turf. Miller.

**640 U G 3**

**Agroclimatology**

Sp. 3 cl.

Prereq.: 15 cr. hrs. of Agron., Bot., Hort. or equiv. at the 300 level or above or permission of instructor.

A study of the radiation regime of the atmosphere in relation to the thermal and water regimes of soils and their interrelationships in crop production.

**643 U G 3**

**Tropical and Subtropical Soils**

A. 3 cl.

Prereq.: 15 cr. hrs. of agron., numbered 300 or higher or permission of instructor.

Not open to students with credit for 543.

A study of the physical, chemical, and biological properties and the fertilization, physical, and water management of tropical and subtropical soils; crop adaptation, plantation, and subsistence farming.

Arscott.

**650\* U G 5**

**Advanced Soil Classification Morphology and Genesis**

W. 4 cl., 1 2-hr. lab., 3 1-day field trips.

Prereq.: 550, 10 cr. hrs. from the following: 442, 621, Bot. 620, Geol. 550.

Theory and principles of soil classification schemes emphasizing the 7th Approximation; classification and genesis of major soils of the world; methods to establish parent material homogeneity and indices of soil weathering. Wilding.

**660 U G 5**

**Soil Microbiology**

Sp. 3 cl., 2 2-hr. labs.

Prereq.: 441 or 442, Microbiol. 509, and Chem. 241.

A study of the morphology and physiology of soil microorganisms and their biochemical transformations of inorganic and organic materials in relation to soil fertility. Miller.

**670 U G 3**

**Soil Fertility**

A. 3 cl.

Prereq.: 441 or 442.

A study of the factors affecting soil productivity and the practices needed in good soil management; fertilizer properties and practices. Arscott.

**671 U G 5**

**Soil Physics**

A. 3 cl., 2 2-hr. labs.

Prereq.: 441 or 442, Physics 131 and Math. 151.

A study of the physical makeup and properties of soil, including structure, thermal relationships, consistency, plasticity, water, and their relationships. Taylor.

**672 U G 5**

**Chemistry of Soils and Fertilizers**

W. 3 cl., 2 2-hr. labs.

Prereq.: 550, 670, Chem. 211 and 9 additional cr. hrs. in Agron. and/or Chem. at the 300 level or higher.

A study of the chemical properties of soils and fertilizers affecting plant growth and composition including modern laboratory analysis of soil, fertilizer, and plant tissue. McLean.

**693 U G 3 or 5**

**Individual Studies**

Su, A, W, Sp.

H693 (honors) may be available to students enrolled in a college honors program or eligible for enrollment.

Prereq.: Permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

Students may select special agronomic problems, not included in regular courses and involving library, laboratory, or field studies.

**694 U G 3 or 5**

**Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

Discussion of selected topics in crop science and/or soil science.

**695 U G 3**

**Organic Soils**

W. 3 cl., 1 1-day field trip.

Prereq.: 550, Geol. 101, and 25 cr. hrs. from Bot. or Chem.

A comprehensive study of organic soils, their formation, chemical and physical characteristics, classification and management. Everett.

**GENERAL PREREQUISITES FOR COURSES  
NUMBERED 700**

Unless otherwise indicated, the prerequisites for 700-level courses are 15 cr. hrs. in courses in the same discipline numbered 400 or higher, plus additional specified course(s) numbered 600 or higher.

**750†\* U G 4**

**Methods of Soil Mineralogical Investigations**

Sp. 2 cl., 2 2-hr. labs.

Prereq.: 15 cr. hrs. selected from the following: 550, 671, 672, Geol. 602, Mineral. 621, 654, Chem. 521, 621, and 676.

Theory, interpretation, and application of mineralogical tools for soil matrices including X-ray diffraction, X-ray spectroscopy, microscopy, thin section and thermal techniques. Wilding.

**786 U G 5**

**Radioactive Tracers in Plant and Soil Research**

W. 2 lec., 3 2-hr. lab.

Prereq.: 672 or Chem. 211 and 15 cr. hrs. in biological sciences at the 400 level or higher.

Radiochemical principles and techniques used in soil and plant research; designed to prepare the student to conduct radio-tracer experiments. Franklin.

**GENERAL PREREQUISITES FOR COURSES  
NUMBERED 800 AND 900**

Unless otherwise indicated, the prerequisites for 800 and 900-level courses are 30 cr. hrs. in courses in the same discipline, or 20 cr. hrs. in the same discipline, plus 25 cr. hrs. in specified allied disciplines.

**822 G 5**

**Physiological and Biochemical Aspects of Herbicides**

W. 4 cl., 1 2-hr. lab.

Prereq.: Bot. 631, Chem. 253, Biochem. 511, and 521.

Herbicide absorption, course, fate, and mode of action in plants; persistence and fate in soils. Bendixen.

**830†\* G 4****Advanced Field Crop Breeding**

W. 3 cl., 1 2-hr. lab.

Prereq.: 530, Genetics 650, and 16 additional cr. hrs. in Agron.

A detailed study of the genetic fundamentals and modern procedures used in the development of plant breeding programs for the improvement of agronomic crops. Ray.

**850\* G 4****Soils of the Cold Regions**

Sp. 3 cl.

Prereq.: 30 cr. hrs. of Agron. or 30 cr. hrs. of Geog. and and Geol. and Ecology.

A study of the morphological, physical, chemical, and biological properties of the soils and environmental features of the polar and alpine regions. Everett.

**860†\* G 3****Chemistry of Soil Organic Matter**

Sp. 3 cl.

Prereq.: 660 and 25 cr. hrs. of Agron., or 20 cr. hrs. Agron. and 25 cr. hrs. Chem., Biochem., or Microbiol.

A comprehensive study of soil organic matter including methods of study, theories of synthesis, physical and chemical properties, accumulation and functions of organic matter. Miller.

**870†\* G 3****Soil-Plant Relationships**

Su (1st term). 3 cl.

Prereq.: 20 cr. hrs. of soil and/or plant sciences and 10 cr. hrs. of plant physiology.

Discussion of recent literature pertaining to growth response curves, nutrient uptake, movement of nutrients in the soil, and measurement of availability of nutrients to plants. McLean and Himes.

**871†\* G 3****Advanced Soil Physics**

W. 3 cl.

Prereq.: 671 and permission of instructor.

Moisture, gaseous, and thermal processes and regimes in vegetated soils and their influences on plant growth. Taylor.

**872 G 5****Physical Chemistry of Soils**

W. 3 cl., 2 3-hr. labs.

Prereq.: 671, 672, Chem. 521 or 532, and 15 additional cr. hrs. in Agron. or Biol.

A study of the physiochemical properties of soil including methods of characterizing clay minerals, soil acidity, ionic absorption and release, and plant nutrient uptake. McLean.

**880 G 2****Seminar**

Su, A, W, Sp. 1 cl.

Repeatable to a maximum of 12 cr. hrs.

Discussion of current problems in agronomy. Bendixen.

**885 G 1****Research Principles and Techniques**

A. 1 cl.

The philosophy of graduate education and the description of the techniques and special equipment most useful for conducting research in crops and soils science. McLean.

**887 G 5****Techniques of Experimental Design**

W. 5 cl.

Prereq.: Genetics 650, 651, and 10 cr. hrs. of Agron., or related subjects at the 400 level or above.

A study of experimental designs and their application to agricultural research. Smith.

**896 G 1-3****Interdepartmental Seminar in Polar and Alpine Studies**

Sp.

(See under Interdepartmental Seminars.)

**897 G 1****Interdepartmental Seminar in Natural Resources**

A, W, Sp.

(See under Interdepartmental Seminars.)

**993 G 3 or 5****Individual Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

Students may select special agronomic problems not included in regular courses.

**994 G 1-5****Group Studies**

A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 12 cr. hrs.

- a. Theory and Application of Clay Membrane Electrodes. Sp.\* McLean
- b. Herbicides and Plant Growth Regulators.

**999 G Arr.****Research**

Su, A, W, Sp.

Research for thesis or dissertation purposes only.

## Air Force Aerospace Studies

Office: 353 ROTC Building, 2121 Tuttle Park Place

Air Force Reserve Officer Training Corps  
Colonel Moody and Staff.

GENERAL MILITARY COURSE  
(Freshmen and Sophomores)

**101 U 2****The USAF and Strategic Offensive Forces**

A. 2 cl., 1 lab. hr.

An introduction to the doctrine, organization, and mission of the USAF; and an examination of the strategic offensive forces of the U.S. Military Establishment—from the standpoints of theory and hardware. Special attention is given to SAC and its retaliatory capability.

**102 U 2**  
**Strategic Defensive Forces**

W. 1 cl., 1 lab. hr.

Prereq.: 101 or permission of Professor of A. F. Aero. S. Examination of Strategic Defensive Forces of the U.S.; analysis of concepts of defense against both manned and unmanned weapons system.

**103 U 2**  
**Tactical Air, General Purpose Forces, and Other Supporting Functions**

Sp. 2 cl., 1 lab. hr.

Prereq.: 102 or permission of Professor of A. F. Aero. S. Study of tactical airpower with emphasis on hardware; doctrine of General Purpose Forces; USAF's supporting commands and agencies.

**201 U 2**  
**National Power and the Nature and Principles of War**

A. 2 cl., 1 lab. hr.

Prereq.: 103 or permission of Professor of A. F. Aero. S. An introduction to the nature and principles of war; overview of the changing role of the military in the achievement of national objectives.

**202 U 2**  
**General War & Sino-Soviet Military/Defense Policies**

W. 1 cl., 1 lab. hr.

Prereq.: 201 or permission of Prof. of A. F. Aero. S. An introduction to theories on general war; overview of military and defense policies of the U.S.S.R. and the People's Republic of China.

**203 U 2**  
**Foreign Policy, Defense Policy, and the Search for Peace**

Sp. 2 cl., 1 lab. hr.

Prereq.: 202 or permission of Prof. of A. F. Aero. S. A survey of U.S. foreign policy to U.N. and NATO; evolution and functions of Defense Department; problems in the search for peace since World War II.

PROFESSIONAL OFFICER COURSE  
(Juniors, Seniors, and Graduate Students)

**301 U 3**  
**History of Aerospace Power**

A. 3 cl., 1 lab.

Prereq.: Completion of General Military Course; completion of Air Force ROTC Two-Year Field Training; or permission of Professor of A. F. Aero. S.

A study of the history of the Air Force and the growth and development of aerospace power.

**302 U 3**  
**Aerospace Power Today and Tomorrow**

W. 3 cl., 1 lab.

Prereq.: 301 or permission of Professor of A. F. Aero. S. An investigation of the fundamental concepts and doctrine undergirding aerospace forces; current and future employment of manned aircraft; introduction to astronautics and space operations.

**303 U 3**  
**Astronautics and Space Operations**

Sp. 3 cl., 1 lab.

Prereq.: 302 or permission of Professor of A. F. Aero. S. A study of aerospace technology; current and future space operations and their relationship to national security.

**401 U 3**  
**Leadership and the Military Justice System**

A. 3 cl., 1 lab.

Prereq.: 303 or permission of Professor of A. F. Aero. S. An analysis of the theories and techniques of leadership; study and practical applications of human relations and behavior; and an introduction to the uniform code of military justice.

**402 U 3**  
**Leadership and Management of Aerospace Forces**

W. 3 cl., 1 lab.

Prereq.: 401 or permission of Prof. of A. F. Aero. S. A study of the variables affecting leadership and the pre-execution phase of military management: planning, organizing, and coordinating.

**403 U 3**  
**Management of Aerospace Forces and Preparation for Active Duty**

Sp. 3 cl., 1 lab.

Prereq.: 402 or permission of Prof. of A. F. Aero. S. A study of the execution phase of military management: directing and controlling, and team and individual presentations which prepare the cadet for active duty as an Air Force Officer.

**411 U 2**  
**Flight Instruction Program**

A, W, Sp. 4 cl. first 6 wks. of qtr.

Prereq.: 303 or permission of Professor of A. F. Aero. S. Flight training fundamentals of Federal Aviation Regulations, aerial navigation and radio procedures, meteorology and flight planning; preparation of student pilots in the Air Force Flight Instruction Program to meet FAA standards.

## Allied Medicine

(School of Allied Medical Professions)

Office: 127 School of Allied Medical Professions Building, 1583 Perry Street

Professors Atwell and Schoen; Associate Professor Burnett; Assistant Professors Allen, Harper, and Swihart.

**101**  
**Introduction to the Health Professions**

A, W, Sp.

An examination of the professions involved in health care.

**101.01 Survey of Health Professions U 2**  
2 cl.

Not open to students with credit for 101.

A survey of each health profession having an academic program at The Ohio State University.

**101.02 Health Professions and Their Dynamics U 3**  
3 cl.

Not open to students with credit for 101 or 101.01.  
Two lecture hours with 101.01; discussions centering on the dynamics of health care comprise the third hour.

**425 U 3**  
**Critical Phases in Life I**

W, Sp. 3 cl.

Prereq.: Biol. 100 and 5 hrs. Psych.

An examination of man's development from conception to death and factors critical to his continuing health.

**520 U G 2**  
**Musculoskeletal Disease**

Sp. 2 cl.

Prereq.: Admission to the School of Allied Medical Professions or permission of instructor.

Not open to students with credit for Phys. Ther. 520. Principles, clinical aspects, and therapeutic procedures related to diseases of the musculoskeletal system.

**530 U G 3**  
**Neuromuscular Disease**

W. 3 cl.

Prereq.: Anat. 201 or permission of instructor.

Not open to students with credit for Phys. Ther. 530.

Survey of injury and disease of the central, peripheral, and autonomic nervous systems; presentation of clinical material.

**591 U P G 3**  
**Health Care Organization**

Sp. 2 1½-hr. cl.

Prereq.: Enrollment in School of Allied Medical Professions or School of Nursing or permission of instructor.

An examination of the roles of public and private organizations in planning and supporting health care, including study of health trends, social legislation, and current professional issues.

**592 U P 2**  
**Interdisciplinary Health Care—Field Study**

A. 4 cl.

Prereq.: Enrollment in School of Allied Medical Professions or School of Nursing or permission of instructor.

Selected patient care experiences that will develop the concept of the Health Care Team.

**610 U G 3**  
**The Hospital as an Educational Institution**

W. 3 cl.

Prereq.: Permission of instructor.

Hospital as a clinical learning environment for medical and allied medical professionals; in-service education; patient and community health education; continuing education.

**625 U G 3**  
**Critical Phases in Life II**

Su, A, Sp. 3 cl.

Prereq.: 425 and Physiol. or permission of instructor.

The application of developmental concepts as reference for evaluation, management, and health care of individuals within their environment.

**630 U P G 3**  
**Management of Hospital Departments**

A, Sp. 3 cl.

Prereq.: Enrollment in School of Allied Medical Professions or permission of instructor.

An analysis of the management process and its application to the hospital setting.

**650 U G 3**  
**Automated Systems in Health Care**

Sp. 2 cl., 1 2-hr. lab.

Prereq.: Permission of instructor.

Not open to students with credit for 550.

Concepts of electronic data processing and automated systems applied to health care; implications and planning requirements for present and future systems.

**693 U G 1-5**  
**Individual Studies**

Su, A, W, Sp. 1-5 cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Guided study of selected topics.

**694 U G 1-5**  
**Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to maximum of 15 cr. hrs.

Supervised group studies of special topics within the various professions of the allied health field.

- 694.01 Circulation Technology**
- 694.02 Hospital and Health Services Administration**
- 694.03 Medical Communications**
- 694.04 Medical Dietetics**
- 694.05 Medical Illustration**
- 694.06 Medical Record Administration**
- 694.07 Medical Technology**
- 694.08 Occupational Therapy**
- 694.09 Physical Therapy**
- 694.10 Radiologic Technology**
- 694.11 Respiratory Technology**

**695 U G 1-6**  
**Seminar**

Su, A, W, Sp. 1-3 cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 9 cr. hrs.

Conferences and group discussions of selected topics.

**797 U P G 1-5**  
**Interdepartmental Seminars**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable by permission of Associate Director of the School.

(See under Interdepartmental Seminars, Course Offerings catalog.)

**999 G Arr.**  
**Research**

Su, A, W, Sp.

Repeatable to a maximum of 6 cr. hrs.

Research for thesis purposes only.

## Anatomy

Office: 4072 Graves Hall, 333 West 10th Avenue

**Professors** St. Pierre (Chairman), Ackerman, Baker (Emeritus), I. Eglitis, J. Eglitis, Gaughran, and Palmer (Emeritus); **Associate Professors** Delphia, Gersten (Emeritus), Hayes, Humbertson, King, Martin, Russell, Trzebiatowski, Vernall, and Wismar; **Assistant Professors** Beran, Boston, Christopher, Clark, Dom, Hairston, Hostetler, Martinek, Negulesco, and Sucheston; **Instructors** Bowman, Camiscioni, Hines, Meli, and Mihailoff.

For related courses see **Biology and Zoology**.

### 200 U 6

#### Introductory Anatomy

Su, A, W, Sp.

Prereq.: Enrollment in School of Nursing, Division of Dental Hygiene, School of Allied Medical Professions, College of Pharmacy, or Pre-Pharmacy, or permission of instructor.

Fundamental principles of human anatomy, supplemented by demonstrations of human material. Negulesco.

### 201 U 5

#### Neuromuscular Anatomy

A. 2 cl., 2 3-hr. labs.

Prereq.: Enrollment in School of Allied Medical Professions or permission of instructor.

Neuromuscular anatomy of the human body. Mihailoff.

### 627 P G 2

#### Clinical Anatomy

W, Sp.

Prereq.: Permission of instructor.

A study of selected anatomical regions correlated with clinical diagnostic methods. Hines and Staff.

### 637 P 3

#### Essentials of Embryonic Development

A. 2 cl., 1 3-hr. lab.

Prereq.: Dent. 1st yr. standing.

The early embryology and organogenesis of man; emphasizing the pig embryo supplemented by human material. Delphia and Clark.

### 638 P G 5

#### Human Anatomy

W, Sp. 3 cl., 2 3-hr. lab.

Prereq.: Dent. 1st yr. standing.

Gross anatomy of the abdomen and limbs. I. Eglitis.

### 639 P G 7

#### Human Anatomy

W, Sp. 4 cl., 3 3-hr. lab.

Prereq.: Dent. 1st yr. standing.

Gross anatomy of the head, neck, and thorax. Gaughran, Boston, and Lauer.

### 640 P G 6

#### Histology

A. 3 cl., 3 3-hr. lab.

Prereq.: Dent. 1st yr. standing.

General histology of the tissues and special histology of the organ systems. Vernall, J. Eglitis, Hayes, and Martinek.

### 641 P G 1

#### Applied Anatomy

A. 1 cl.

Prereq.: Dent. 3rd yr. standing.

Anatomy of the head and neck as applied to clinical dentistry. Russell.

### 693 U G 2-5, P 6, 12, 18

#### Individual Studies in Anatomy

Su, A, W, Sp. 1 month, offered all months.

Prereq.: Permission of instructor.

Repeatable to a maximum of 24 cr. hrs. for professional credit.

Designed to enable the student to pursue a minor investigation in some anatomical field of his choice.

### 700 U G 6

#### Mammalian Histology

Sp. 3 cl., 3 2-hr. labs.

Prereq.: Enrollment in School of Allied Medical Professions or permission of instructor.

A microscopic study of mammalian cells, tissues, and organs with particular emphasis on human and other selected vertebrates; consideration of the comparative aspect of microscopic structure in relation to function for the various organ systems. Hayes.

### 701 U G 6

#### Human Gross Anatomy

W. 3 cl., 3 3-hr. labs.

Prereq.: Permission of instructor.

Regional dissections of upper limb, head, neck and thorax with a study of cross sections and normal x-rays. Gaughran.

### 702 U G 4

#### Human Gross Anatomy

Sp. 2 cl., 2 3-hr. labs.

Prereq.: Permission of instructor.

Regional dissection of abdomen, pelvis, and lower limb with a study of cross sections and normal x-rays. Gaughran.

### 703 U G 4

#### Human Developmental Anatomy

W. 1 cl., 1 2-hr. lab., 1 to 2 hrs. recitation.

Prereq.: Permission of instructor.

Detailed analysis of the growth and differentiation of individual organ systems; role of growth factors in differentiation of these systems; common anomalies; discussions of contemporary research methods and innovative teaching techniques. Delphia and Clark.



**704 U G 6****Human Neuroanatomy**

A. 3 cl., 3 2-hr. labs.

Prereq.: Permission of instructor.

Functional anatomy of the central nervous system and its pathways, cross sections of the brain and spinal cord will be utilized. Humbertson, Clark, Dom, King, and Martin.

**735 P G 5****Anatomy of the Visual System**

Sp. 2 cl., 2 3-hr. labs.

Prereq.: 653, 663, 673, 683, or equiv., and permission of instructor; resident standing in Ophthal.

The gross anatomy, histology, neuroanatomy, and embryology of the human visual apparatus; its structure, function, and some clinical applications. I. Eglitis.

**740 P G 3****Medical Education**

A, Sp. 3 cl.

Prereq.: Permission of instructor.

Introductory experiences in administrative and functional aspects of all phases of medical education, including observation of methods, evaluation, curriculum design, student selection, and educational research. Trzebiatowski.

**797 U P G 1-5****Interdepartmental Seminar**

A, W, Sp.

(See under Interdepartmental Seminars, Course Offerings catalog.)

**805 G 5****Anatomical Techniques**

A. Arr.

Prereq.: Permission of instructor.

Open only to grad. students in Anat.

The preparation of biological materials for light and electron microscopy. Wismar and Hostetler.

**850 G 1****Seminar in Anatomy**

W, Sp.

Repeatable to a maximum of 20 cr. hrs.

Discussions of research in progress and reports from the literature of current anatomical problems.

**911 G 3 or 5****Advanced Studies in Anatomy**

Su, A, W, Sp. Arr.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

**911.01 Blood and Hemopoiesis**

Morphology of normal and abnormal human blood and bone marrow; developmental hemopoiesis and cellular immune response in various animals. Ackerman and St. Pierre.

**911.02 Connective Tissue and Bone**

Activities of fibrous connective tissues emphasizing formation and maintenance of fibers and ground substance; dynamics of the structure, chemistry, and metabolism of bone. J. Eglitis, Melfii, and Wismar.

**911.03 Embryology**

Mammalian embryological development emphasizing descriptive or experimental approach; metabolic aspects of development including enzymatic changes, hormonal effects, environmental factors, and teratogenic agents. Delphia, Clark, Hayes, Sucheston, Vernall, and Wismar.

**911.04 Microscopic Anatomy**

Advanced studies in selected areas of microscopic anatomy. Ackerman, J. Eglitis, Hayes, Hostetler, Martinek, St. Pierre, Vernall, and Wismar.

**911.05 Neuroanatomy**

Advanced study of a particular system or systems in the central nervous system, including literature perusal. Martin, Humbertson, Clark, Dom, and King.

**911.06 Epithelium**

Covering, lining, and glandular divisions; functional significance of exocrine and endocrine glands. J. Eglitis.

**911.07 Ultrastructure of the Central Nervous System**

Ultrastructure of neuron, neuroglia, and the neuropil of the mammalian central nervous system. Hostetler and King.

**911.08 Electron-Microscopy**

Examination of specific tissues or cellular populations using electron micrographs; no actual use of the electron microscope. Ackerman, Hostetler, King, and Martinek.

**911.09 Instrumentation and Techniques in Experimental Neuroanatomy**

Practical experience in learning techniques utilized in neuroanatomical research problems. Martin, Clark, Dom, Humbertson, and King.

**911.10 Principles of Human Cytogenetics**

Human cytogenetics as related to autosomal and sex chromosomes; technique of tissue culture for study of human chromosome(s) and karyotype analysis. Hayes.

**911.11 Design of Computer Teaching Programs**

Methods and logic of writing subject oriented computer assisted instruction (CAI) programs. Wismar and Christopher.

**911.12 Anatomy of Newborn**

Gross anatomy of the newborn correlated with prenatal and postnatal development; dissection and section study. Gaughran and I. Eglitis.

**911.13 Topographical Anatomy**

Study of unmounted serial cross sections of selected regions of the human body emphasizing the inter-relationship of structures to one another in a three-dimensional perspective. Gaughran, I. Eglitis, and Russell.

**911.14 Advanced Regional Dissections**

Careful dissection of one or more regions of the body, supplemented with literature research. Gaughran, I. Eglitis, and Russell.

**911.15 Human Anatomy: Radiological Manifestations**

Methods of routine projections and interpretations for best visualizing anatomical structures.

**999 G Arr.****Research in Anatomy**

Su, A, W, Sp.

Research for thesis or dissertation purposes only.

## Anesthesiology

Office: 632 University Hospital, 410 West 10th Avenue

**Professor Hamelberg** (Chairman); **Associate Professors** Collins, Garvin, and Lenahan; **Assistant Professors** Anderson, Best, DeLeo, Franklin, Gauthier, Imboden, Knisely, LeVere, Prince, Reier, Siddal, Stone, E. Warner, and Welch.

### 737 P 1 Clinical Anesthesiology

16 cl. hrs.

Prereq.: Med. 4th yr. standing; concur. 5 or 11 cr. hrs. Surg. 736.

(Offered concur. with Surg. 736.)

Didactic instruction, demonstration, and clinical observation of anesthetic agents and techniques, covering fundamentals of cardiopulmonary resuscitation, use of local anesthetic agents, inhalation therapy, premedication, and anesthetic agents and techniques. Hamelberg and Staff.

### 793 Individual Studies in Anesthesia

1, 2, 3, or 4 months;  
offered all months. P 6, 12, 18

Su, A, W, Sp. G 3-5

Prereq.: Permission of instructor.

Repeatable to a maximum of 24 cr. hrs. for professional credit; repeatable to a maximum of 15 cr. hrs. for graduate credit.

Designed to offer to medical and graduate students an opportunity to pursue research related to anesthesia in either basic science or clinical science. Hamelberg and Staff.

### 794 P 6 Group Studies in Anesthesia

1 month, offered all months.

Prereq.: Permission of instructor.

Repeatable to a maximum of 12 cr. hrs.

Course designed to give medical students clinical experience in the administration of anesthesia. Hamelberg and Staff.

### 850 G 3 or 5 Seminar in Anesthesiology

Su, A, W, Sp.

Prereq.: Permission of instructor.

Group and individual discussions of current problems in anesthesiology and their management; discussions of basic and applied topics.

### 999 G Arr. Research in Anesthesiology

Su, A, W, Sp.

Research for thesis purposes only.

## Animal Science

Office: 110 Animal Science Building, 2029 Fyffe Road

**Professors Johnson** (Chairman), Cahill, Cline, Dehority, Grimshaw, Harvey, Klosterman, (Associate Chairman, Wooster), Kottman, Ludwick, Moxon, Newland, Ockerman, Parker, Preston, Reed, Swiger, Tyznik, VanStavern, Venzke, G. R. Wilson, and R. F. Wilson; **Associate Professors** Barnes, Judy, and Plimpton; **Assistant Professors** Althouse, Bishop, Boyles, Grifo, Hutton, Isler, Mahan, McClure, Potter, Smith, and Wharton.

### 100 U 5 Domestic Animals in the Service of Man

A, W, Sp. 5 cl.

(Offered in cooperation with the Depts. of Dairy Sc. and Poul. Sc.)

The role of the animal industry in the world and the importance of the application of science in meeting the needs in the production, distribution, and utilization of animal products. Plimpton, Stephens, and McGrew.

#### GENERAL PREREQUISITES FOR COURSES NUMBERED 200

Unless otherwise indicated, the prerequisites for 200-level courses are 45 cr. hrs. in collegiate courses, exclusive of ROTC and Phys. Ed.; or specified course(s) numbered 100-199.

### 200 U 5 Introductory Animal Science

A, W, Sp. 3 cl., 2 2-hr. lab.

Introduction to selection, breeding, feeding, management, marketing, and utilization of beef cattle, swine, and sheep; a limited discussion of the horse is included. Plimpton, Judy, and R. Wilson.

### 250 U 3 Meat Selection and Identification

A, W, Sp. 3 2-hr. lab.

The structure and composition of beef, pork, veal, and lamb are used to distinguish grades and usefulness of meat products for domestic and institutional purposes. Kunkle.

#### GENERAL PREREQUISITES FOR COURSES NUMBERED 300 AND 400

Unless otherwise indicated, the prerequisites for 300 and 400-level courses are 90 cr. hrs. in collegiate courses, exclusive of ROTC and Phys. Ed.; or specified course(s) numbered 100-399.

### 420 U 5 Principles of Animal Improvement

A, W, Sp. 5 cl.

Prereq.: 100, Math. 150 or equiv., and Genetics 140 or 314.

Not open to students with credit for Dairy Sc. 420 or Poul. Sc. 420.

(Cross-listed in the Depts. of Dairy Sc. and Poul. Sc.)

An introduction to the methods available for bringing about genetic change in farm animals. Fechheimer, Jaap, and Swiger.

430

U 5

**Principles of Animal Nutrition**

Su (1st term), A, W, Sp. 4 cl., 1 2-hr. lab.

Prereq.: Chem. 102 or 122 and Math. 150 or equiv.

Not open to students with credit for Dairy Sc. 430 or Poul. Sc. 430.

(Cross-listed in the Depts. of Dairy Sc. and Poul. Sc.)

A study of the fundamental principles of nutrition in mammals and birds. Cline, Latshaw, and Tyznik.

440

U 5

**Livestock Management**

W. 3 cl., 2 2-hr. lab.

Prereq.: 200 and 430.

Not recommended for animal science majors.

Feeding, breeding, and managing of beef, sheep, and swine; laboratory exercises are concerned with major management problems. G. Wilson.

452

U 3

**Meat and Meat Products**

A, W, Sp. 3 cl.

Prereq.: 5 credit hrs. animal sc.

Not open to students with credit for Animal Sc. 450.

Analysis of the interdependent factors of meat animals, meat and meat products, processing and merchandising in their relationship to man as producer, processor, and consumer.

453

U 3

**Meat and Meat Products Laboratory**

A, W, Sp. 2 3-hr. lab.

Prereq. or concur.: 452.

Conversion of meat animals to the variety of consumer products; slaughter, cutting, curing, preservation, and other processing; product evaluation related to animal value and consumer needs.

455

U 3

**Meat Animal and Carcass Evaluation**

Sp. 1 cl., 2 2-hr. lab.

Prereq.: 200.

Not open to students with credit for 451.

The factors that influence the value of meat animals, carcasses, and wholesale cuts in accordance with recognized grading standards; laboratory practice. Althouse.

**GENERAL PREREQUISITES FOR COURSES  
NUMBERED 500**

Unless otherwise indicated, the prerequisites for 500-level courses are 15 cr. hrs. in courses in the same discipline numbered 200 or higher, or 10 cr. hrs. in courses numbered 200 or higher in the same discipline, plus 10 cr. hrs. in courses numbered 200 or higher in specified allied disciplines; or baccalaureate degree.

500

U G 5

**Livestock Selection**

Sp. 5 2-hr. lab-discussions.

Prereq.: 200, 430, and 5 additional cr. hrs. in 541, 542, 543, or 544.

Laboratory exercises employing current standards of animal excellence including carcass value for the selection and improvement of farm livestock. G. R. Wilson.

**Livestock Marketing**

(See Agr. Econ. 522.)

(Offered in cooperation with the Dept. of Agr. Econ.)

541

U G 5

**Horse Production and Management**

A. 3 cl., 2 2-hr. lab.

Prereq.: 200, 430, and 5 additional cr. hrs. in Animal Sc., or Dairy Sc.

The application of science and basic principles of nutrition, genetics, physiology, and marketing to the production and management of horses. Hutton.

542

U G 5

**Beef Cattle Production and Management**

A, Sp. 3 cl., 2 2-hr. lab.

Prereq.: 200, 430, and 5 additional cr. hrs. in Animal Sc., Dairy Sc., or Poul. Sc.

The application of science and basic principles of nutrition, genetics, physiology, and marketing to the production and management of beef cattle. G. R. Wilson.

543

U G 5

**Swine Production and Management**

W, Sp. 3 cl., 2 2-hr. lab.

Prereq.: 200, 430, and 5 additional cr. hrs. in Animal Sc., Dairy Sc., or Poul. Sc.

Selection of breeding stock, reproduction, feeding, management, and sale of commercial and breeding swine; swine herds, markets, and research stations are visited. R. F. Wilson.

544

U G 5

**Sheep Production and Management**

W, Sp. 3 cl., 2 2-hr. lab.

Prereq.: 200, 430, and 5 additional cr. hrs. in Animal Sc., Dairy Sc., or Poul. Sc.

The application of science and basic principles of nutrition, genetics, physiology, and marketing to the production and management of sheep. Judy.

550

U G 3

**Meat Processing**

A. 2 cl., 1 2-hr. lab.

Prereq.: 450 or 452.

Fundamental changes in soft animal tissue resulting from comminution and application of chemicals and heat. Cahill.

593

U G 2-5

**Individual Studies**

Su, A, W, Sp.

H593 (honors) may be available to students enrolled in a college honors program or eligible for enrollment.

Prereq.: Junior or senior standing and permission of instructor.

Special assignments and elementary research; problems assigned after consultation with instructor in charge.

594

U G 2-5

**Group Studies**

Su, A, W, Sp.

Prereq.: Junior or senior standing and permission of instructor.

Special assignments and elementary research; problems assigned after consultation with instructor in charge.

**GENERAL PREREQUISITES FOR COURSES  
NUMBERED 600**

Unless otherwise indicated, the prerequisites for 600-level courses are 15 cr. hrs. in courses in the same discipline numbered 300 or higher, or 10 cr. hrs. in courses numbered 300 or higher in the same discipline, plus 10 cr. hrs. in courses numbered 300 or higher in specified allied disciplines.

**610 U G 3**

**Physiology of Lactation**

A. 2 2-hr. cl.

Prereq.: Vet. Physiol. 211 and 20 cr. hrs. of Dairy Sc., Animal Sc., or vertebrate biology.

Not open to students with credit for Dairy Sc. 610.

(Cross-listed in the Dept. of Dairy Sc.)

The physiological, endocrine, nutritional, and environmental factors influencing the synthesis and ejection of milk. Barr and Porter.

**612 U G 3**

**Physiology of Reproduction and Growth**

Sp. 3 1-hr. lec.

Prereq.: Vet. Physiol. 211 and 20 cr. hrs. of Dairy Sc., Animal Sc., or vertebrate biology.

Not open to students with credit for Dairy Sc. 612.

(Cross-listed in the Dept. of Dairy Sc.)

Physiology of the reproductive system and of growth and development in farm animals; factors influencing reproductive performance. Ludwick.

**613 U G 3**

**Laboratory in Reproductive Physiology and Artificial Insemination**

Sp. 2 2-hr. lab.

Prereq. or concur.: 612.

Not open to students with credit for Dairy Sc. 613.

(Cross-listed in the Dept. of Dairy Sc.)

Comparative anatomy and physiology of reproduction of farm animals; physiological bases for the use of artificial insemination in research laboratory and in the field. Ludwick.

**630 U G 5**

**Nutrition and Feeding of Monogastric Animals**

A, W, Sp. 4 cl., 1 2-hr. lab.

Prereq.: 430 or equiv.

Not open to students with credit for Poul. Sc. 630.

(Cross-listed in the Dept. of Poul. Sc.)

The nutrition of swine, poultry, and laboratory animals; principles and practice. Latshaw and Mahan.

**631 U G 5**

**Nutrition and Feeding of Ruminant Animals**

Su, A, W, Sp. 4 cl., 1 2-hr. lab.

Prereq.: 430 or equiv.

Not open to students with credit for Dairy Sc. 631.

(Cross-listed in the Dept. of Dairy Sc.)

The nutrition of dairy cattle, beef cattle, and sheep; principles and practice. Cline, Staubus, and Tyznik.

**650 U G 3**

**Advanced Meat Technology**

Sp. 2 cl., 2 1-hr. lab.

Prereq.: 15 cr. hrs. Chem., 5 cr. hrs. Microbiol., and 5 cr. hrs. Anat.

Evaluation of scientific contribution to meat products and processing. Cahill and Ockerman.

**651 U G 5**

**Laboratory Analysis of Meat Products**

W. 2 cl., 2 1-hr. lab., 4 hrs. arr.

Prereq.: 450 or 452, 453; 10 cr. hrs. Chem., and 5 cr. hrs. Microbiol.

Analysis of meat products by physical, chemical, and microbiological techniques. Borton and Ockerman.

**693 U G 3-5**

**Individual Studies**

Su, A, W, Sp.

H693 (honors) may be available to students enrolled in a college honors program or eligible for enrollment.

Prereq.: Permission of instructor.

Special assignments and advanced research; problems assigned after consultation with the instructor in charge.

**694 U G 3-5**

**Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Special assignments and advanced research; problems assigned after consultation with the instructor in charge.

**GENERAL PREREQUISITES FOR COURSES  
NUMBERED 700**

Unless otherwise indicated, the prerequisites for 700-level courses are 15 cr. hrs. in courses in the same discipline numbered 400 or higher, plus additional specified course(s) numbered 600 or higher.

**710† U G 3 or 5**

**Advanced Reproductive Physiology**

Sp. 2 2-hr. cl.

Prereq.: 612 and acceptable courses in Physiol., Anat., and Biochem.

Not open to students with credit for Dairy Sc. 710.

(Cross-listed in the Dept. of Dairy Sc.)

Recent advances in research in mammalian reproduction; optional individual research experience in reproductive problems with small and large mammals for additional credit. Gomes and VanDemark.

**720 U G 5**

**Genetics of Animal Populations**

W. 5 cl.

Prereq.: 420 or Genetics 630, and 10 cr. hrs. Math.

Not open to students with credit for Dairy Sc. 720 or Poul. Sc. 720.

(Cross-listed in the Depts. of Dairy Sc. and Poul. Sc.)

Theory and practice of analyzing and altering the genetic composition of animal populations. Swiger.

**GENERAL PREREQUISITES FOR COURSES  
NUMBERED 800 AND 900**

Unless otherwise indicated, the prerequisites for 800 and 900-level courses are 30 cr. hrs. in courses in the same discipline, or 20 cr. hrs. in the same discipline, plus 25 cr. hrs. in specified allied disciplines.

**800 G 1**

**Seminar**

A, W, Sp.

Prereq.: Animal Sc. grad. standing.

Discussions of current animal science research.

**810 G 3****Advances in Physiology of Domestic Animals**

A, W, Sp. 4-hr. cl.

Prereq.: Permission of instructor and acceptable courses in Physiol., Anat., and Biochem.

Not open to students with credit for Dairy Sc. 810 or Poul. Sc. 810.

(Cross-listed in the Depts. of Dairy Sc. and Poul. Sc.)

**810.01\* Adrenal Function**

A.

Brown and Gomes.

**810.02†\* Endocrinology of Reproduction**

W.

Gomes.

**810.03\* Immunology and Immunogenetics**

Sp.

Hines.

**810.04†\* Thyroid and Parathyroid Function**

A.

Hibbs.

**810.05†\* Mammalian Germ Cells**

W.

VanDemark.

**810.06†\* Biometerology and Animal Performance**

Sp.

Ludwick.

**820 G 3****Current Topics in Animal Genetics**

3 cl.

Prereq.: Acceptable courses in Animal Genetics, Math., and Statistics.

Not open to students with credit for Dairy Sc. 820 or Poul. Sc. 820.

Repeatable to a maximum of 12 cr. hrs.

(Cross-listed in the Depts. of Dairy Sc. and Poul. Sc.)

**820.01 Selection Index Theory**

Sp.

Harvey.

**820.02\* Non-additive Genetic Variance**

W.

Harvey and Swiger.

**820.03\* Polymorphic Systems**

W.

Fechheimer.

**820.04†\* Simulation of Genetic Systems**

W.

Harvey.

**820.05†\* Cytogenetics of Animal Populations**

W.

Fechheimer.

**820.06†\* Physiological Indices in Animal Breeding**

A.

Fechheimer and Jaap.

**830 G 3****Advanced Studies in Nutrition**

Su, A, W, Sp. 3 or 4 cl.

Prereq.: Permission of instructor.

Not open to students with credit for Dairy Sc. 830 or Poul. Sc. 830.

(Cross-listed in the Depts. of Dairy Sc. and Poul. Sc.)

**830.01\* Energy**

A.

Conrad.

**830.02\* Minerals**

W.

Cline.

**830.03\* Proteins and Amino Acids**

Sp.

Mahan, Naber, and Vivian.

**830.04†\* Vitamins**

A.

Naber and Tyznik.

**830.05\*† Lipids**

W.

Palmquist.

**830.06\*† Laboratory Methods in Nutrition**

Sp.

Allred, Mahan, and Vivian.

**830.07\* Rumen Microbiology**

Su.

Dehority.

**898 G 1****Interdepartmental Seminar  
in Nutrition and Food Technology**

(See Interdepartmental Seminars.)

**999 G Arr.****Research**

Su, A, W, Sp.

Research for thesis or dissertation purposes only.

## Anthropology

Office: 13 Page Hall, 65 South Oval Drive

**Professors** Bourguignon (Chairman), Estel (Emeritus), Lehiste, Messenger, and Williams; **Adjunct Professor** Baby; **Associate Professors** Arewa, Callaghan, Hughes, and Poirier; **Assistant Professors** Chen, Dancy, Fiedl, Post, Schwarz, and Sumner.

**200 U 5****Introduction to Physical Anthropology**

Su, A, W, Sp. 5 cl.

Prereq.: 2nd yr. standing.

Not open to students with credit for 251.

A survey of man as a biological and cultural organism; evolutionary theory; primate evolution from living and fossil evidence; contemporary human population adaptability. Poirier, Post, and Staff.

**201 U 5****Introduction to Prehistory**

Su, A, W, Sp. 5 cl.

Prereq.: 2nd yr. standing.

Not open to students with credit for 261.

A survey of world archaeology; the origin and development of human culture as illustrated by selected examples. Dancy and Sumner.

**202 U 5**  
**Introduction to Cultural Anthropology**

Su, A, W, Sp. 5 cl.  
H202 (Honors) may be available to students enrolled in a college Honors Program or by permission of dept.  
Prereq.: 2nd yr. standing.  
Not open to students with credit for 210.  
Comparative survey of tribal and peasant peoples in the several world culture regions; culture concepts; study of selected topics. Messenger and Staff.

**412 U 4**  
**Indians of the Americas**

W, Sp. 4 cl.  
Prereq.: 5 cr. hrs. anthro., or equiv. or permission of instructor.  
American Indian cultures of the time of European conquest.

**414 U 4**  
**Ethnology of Asia**

W. 4 cl.  
Prereq.: 5 cr. hrs. of anthro., or equiv. or permission of instructor.  
A survey of the peoples of Asia; high civilizations and tribal cultures; prehistoric origins of Asian cultures; the distribution of physical types; languages; social customs.

**415 U 4**  
**Ethnology of Africa**

A, W. 4 cl.  
Prereq.: 5 cr. hrs. of anthro., or equiv. or permission of instructor.  
The peoples of Africa south of the Sahara; distribution of physical types; languages; cultural areas; West Coast kingdoms as source of the American Negro. Arewa.

**416 U 3**  
**Peoples and Cultures of Latin America**

W. 3 cl.  
Prereq.: 5 cr. hrs. of anthro., or equiv. or permission of instructor.  
The pre-Columbian background; contemporary races, cultures, and social organization; the emergence of Latin America as a distinct culture area in the modern world. Schwarz.

**500 U 3**  
**Dynamics of American Culture**

A. 3 cl.  
Prereq.: 5 cr. hrs. of anthro., or equiv. or permission of instructor.  
Not open to students with credit for 401.  
A review of American customs, institutions, social systems, and ideas, with emphasis on recent cultural anthropological studies. Hughes.

**505 U 4**  
**Social Relations in Folk Societies**

A, Sp. 4 cl.  
Prereq.: 5 cr. hrs. of anthro., or equiv., or permission of instructor.  
Not open to students with credit for 410.

Forms of social organization in simpler societies; dynamics of social relations in such societies; a comparison of simpler forms of social structure with complex forms. Schwarz.

**510 U 4**  
**Culture Contact and Technological Change**

Sp. 4 cl.  
Prereq.: 202 and Soc. 101 or 201 or equiv. or permission of instructor.  
Consequences for folk societies of the diffusion of Euro-American culture; introduction of advanced technology to underdeveloped areas; cultural aspects of colonialism and military government. Hughes.

**515 U 4**  
**Religion in Folk Societies**

W. 4 cl.  
Prereq.: 5 cr. hrs. of anthro., or equiv. or permission of instructor.  
Not open to students with credit for 610.  
World views in folk societies, emphasizing religion and sacred beliefs; integration of these beliefs with social organization and the arts. Bourguignon and Messenger.

**520 U G 3**  
**Culture Patterns and Personality**

Sp. 3 cl.  
Prereq.: Soc. 470 or equiv. or Psych. 320 or equiv. or permission of instructor.  
Not open to students with credit for 509.  
Anthropological contributions to the field of social psychology; variations in personality as associated with variations in culture; the range of personality differences within various cultures. Bourguignon and Messenger.

**525 U 4**  
**Theory and Problems of Cultural Anthropology**

W. 4 cl.  
Prereq.: 20 cr. hrs. in allied subjects or permission of instructor.  
Not open to students with credit for 570.  
Major theoretical viewpoints in cultural anthropology; significance of the cultural approach; applied anthropology in psychology and other social sciences. Schwarz.

**530 U 4**  
**Fossil Man**

W. 4 cl.  
Prereq.: 200 or equiv. or 15 cr. hrs. in Biological Sciences or Geol. or permission of instructor.  
Not open to students with credit for 450.  
A comprehensive study of the fossil hominids; fossils of *Homo sapiens* and their relation to other fossil hominids. Poirier.

**535 U 4**  
**Physical Variability of Modern Man**

Sp. 4 cl.  
Prereq.: 200 or equiv., or 15 cr. hrs. in biological sciences, including genetics, or permission of instructor.  
Not open to students with credit for 452.  
The racial classification of man on a biological basis; the evolution of *Homo sapiens* and the development of human variability; racial differences and mixtures. Post.

**540† U 2****Osteometry**

W. 1 hr. lec., 3-hr. lab.

Prereq. or concur.: 530 or equiv. or permission of instructor.

Not open to students with credit for 454.

Laboratory measurements of human skeletons.

**541† U 2****Anthropometry**

Sp. 1 hr. lec., 3-hr. lab.

Prereq. or concur.: 535 or equiv. or permission of instructor.

Not open to students with credit for 456.

Laboratory measurements of living human beings.

**545 U 3****Research Methods in Physical Anthropology**

A. 3 cl.

Prereq.: 15 cr. hrs. of anthro. or 10 cr. hrs. of anthro. and 10 cr. hrs. of closely related work, or permission of instructor.

Not open to students with credit for 640.

Methods used in the analysis and classification of man in both comparative and evolutionary approaches. Poirier and Post.

**551 U 4****Regional Survey in Prehistory**

A, Sp. 4 cl.

Prereq.: 201 or equiv. or permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Survey of prehistory of selected region from earliest times until rise of literate civilization; emphasis on current research and problems of general anthropological interest.

- a. North America
- b. Mesoamerica
- c. Middle East

**555 U 4****Principles of Research in Archaeology**

Sp.

Prereq.: 201 or equiv. plus 5 additional cr. hrs. of anthro. or 10 cr. hrs. of work closely related to archaeological field research, and permission of instructor.

Not open to students with credit for 662.

Instruction in basic methods of archaeological analysis, including artifact typology and cultural classification; methods of excavation and recording; one-day or weekend field sessions. Baby.

**565 U 8-16****Archaeological Training Expedition**

Su. 8 cr. hrs. for either term.  
(Full time in expedition camps.)

Prereq.: 555 or equiv. or 10 cr. hrs. of work closely related to archaeological field research, and permission of instructor.

Not open to students with credit for 664.

Joint expedition of The Ohio State University Department of Anthropology, and the Ohio State Museum, engaged in excavating prehistoric sites in Ohio; experience in archaeological field work. Baby and Staff.

**675 U G 4****Introduction to Anthropological Linguistics**

W. 4 cl.

Prereq.: 10 cr. hrs. of anthro. or permission of instructor.

Not open to students with credit for 575.

Relations of language to social organization, world view, socialization, and cultural analysis. Callaghan.

**693 U 1-4****Individual Studies**

Su, A, W, Sp.

Prereq.: 30 cr. hrs. of anthro. or permission of instructor.

Repeatable to a maximum of 18 cr. hrs. for each decimal subdivision.

- 693.01 Theory
- 693.02 History
- 693.03 Anthropological Linguistics
- 693.04 Research Methodology
- 693.05 Prehistory
- 693.06 Ethnography
- 693.07 Physical Anthropology
- 693.08 Unclassified

**694 U G 2-5****Group Studies**

A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Designed to give groups of students an opportunity to pursue special studies in topics not otherwise offered.

**H783 U 3-5****Honors Course**

Su, A, W, Sp.

Prereq.: 4th yr. standing with a grade of A in at least half of the anthro. courses and an average of B in the remainder; permission of the instructor under whose supervision the work is to be completed and the Arts and Sciences Honors Committee.

At least 2 qtrs. are required of candidates for the degree Bachelor of Arts with distinction in anthro. Failure to receive a mark of S in this course is a disqualification for special honors.

Repeatable to a maximum of 15 cr. hrs.

**803 G 5****Seminars in Anthropology**

A, W, Sp.

Repeatable to a maximum of 35 cr. hrs. not more than 5 of which shall be in any one of the following topics:

- a. Theory
- b. History
- c. Anthropological Linguistics
- d. Prehistory
- e. Ethnology
- f. Physical Anthropology
- g. Cultural Anthropology
- h. Unclassified

**805 G 3-5**

**Seminars in Ethnology**

A, W, Sp. 1 2-hr. cl.

Repeatable to a maximum of 30 cr. hrs., not more than five of which shall be in any one of the following topics.

- a. North America
- b. South America
- c. East Asia
- d. Southeast Asia
- e. Oceania
- f. South Asia
- g. Middle East
- h. Africa
- i. Europe
- j. Circumpolar

**810 G 3-5**

**Seminars in Cultural Anthropology**

A, W, Sp. 1 2-hr. cl.

Repeatable to a maximum of 30 cr. hrs., not more than 5 of which shall be in any one of the following topics.

- a. Nature of Culture
- b. Acculturation, Change, and Stability
- c. Culture and Personality
- d. Enculturation
- e. Social Organization
- f. Religious Behavior
- g. Field Methods in the Study of Culture
- h. Theory and Problems in Cultural Anthropology
- i. Peasant Cultures
- j. Cultural Evolution
- k. Human Ecology

**820 G 3-5**

**Seminars in Physical Anthropology**

A, W, Sp. 1 2-hr. cl.

Repeatable to a maximum of 30 hrs., not more than 5 of which shall be in any one of the following topics.

- a. Theory and Method in Physical Anthropology
- b. Serology
- c. Primate Structure and Behavior
- d. Fossil Man
- e. Osteometry
- f. Anthropometry
- g. Physical Variability of Man
- h. The Physical Anthropology of Selected World Culture Regions

**830 G 3-5**

**Seminars in Prehistory**

A, W, Sp. 1 2-hr. cl.

Repeatable to a maximum of 30 cr. hrs., not more than 5 of which shall be in any one of the following topics.

- a. Method and Theory in Archaeology
- b. North American Archaeology
- c. South American Archaeology
- d. European Archaeology
- e. Asian Archaeology
- f. African Archaeology
- g. Oceanic Archaeology
- h. Archaeology of High Civilizations
- i. Special Problems in Archaeology

**840 G 3-5**

**Seminars in Anthropological Linguistics**

A, W, Sp. 1 2-hr. cl.

Repeatable to a maximum of 30 cr. hrs., not more than 5 of which shall be in any one of the following topics.

- a. Animal Communication and Human Language
- b. Social Structure and Language
- c. Enculturation and Language
- d. Languages and Cultural Structuring of Perceptual Patterns
- e. Ethnography of Language
- f. Language as a Research Tool in Ethnography, Ethnology, and Cultural Anthropology

**850 G 3**

**Seminars in Museology**

A, W, Sp. 1 2-hr. cl.

Repeatable to a maximum of 9 cr. hrs., not more than 3 of which shall be in any one of the following topics.

- a. Introduction
- b. Problems
- c. Research Methods

**896 G 1-3**

**Interdepartmental Seminar in Polar and Alpine Studies**

Sp.

(See under Interdepartmental Seminars.)

**899 G 1-5**

**Interdepartmental Seminar**

Su, A, W, Sp.

(See under Interdepartmental Seminars.)

**993 G 1-5**

**Individual Studies**

Su, A, W, Sp. 2 conf. hrs.

Repeatable to a maximum of 18 cr. hrs., not more than 6 of which shall be in any one of the following topics.

- a. Theory
- b. History
- c. Anthropological Linguistics
- d. Research Methods
- e. Prehistory
- f. Ethnology
- g. Physical Anthropology
- h. Cultural Anthropology
- i. Unclassified

**994 G 3**

**Group Studies**

A, W, Sp. 1 2-hr. cl.

Repeatable to a maximum of 12 cr. hrs.; topics may not be repeated.

- a. Theory
- b. History
- c. Anthropological Linguistics
- d. Research Methods
- e. Prehistory
- f. Ethnology
- g. Physical Anthropology
- h. Cultural Anthropology
- i. Unclassified



**998 G Arr.**  
**Research in Anthropology: Thesis**  
 Su, A, W, Sp.  
 Research for thesis purposes only.

**999 G Arr.**  
**Research in Anthropology: Dissertation**  
 Su, A, W, Sp.  
 Research for dissertation purposes only.

## Arabic

Office: 248 Dieter Cunz Hall of Languages, 1841 Millikin Road

Professor Griffin (Chairman); Associate Professor Cadore; Assistant Professor Zwettler

**101 U 5**  
**Introduction to Modern Literary Arabic**  
 A. 5 cl.  
 Sound and writing systems, morphological patterns, basic sentences with brief dialogues.

**102 U 5**  
**Introduction to Modern Literary Arabic**  
 W. 5 cl.  
 Prereq.: 101.  
 Continuation of morphological patterns and basic syntactic structures, with long dialogues and simple pieces of expository prose.

**106 U 3**  
**Basic Colloquial Arabic**  
 A. 3 cl.  
 Introduction to the phonology and grammar of the spoken language of educated urbanites of the Eastern Arab world.

**107 U 3**  
**Basic Colloquial Arabic**  
 W. 3 cl.  
 Prereq.: 106 or permission of instructor.  
 Continuation of 106; analysis of and drill in morphological and syntactic patterns; expansion of vocabulary; practice in conversation.

**110 U 5, 10**  
**Intensive Elementary Arabic**  
 Su, A, W, Sp. 10 cl.  
 Prereq.: Permission of dept.  
 Not open to students with credit for 102. Students with credit for 101 or equiv. may not register for more than 5 cr. hrs.  
 Elementary Arabic for students wishing to acquire the basic skills in one quarter; intensive drill in forms, syntax, vocabulary, and idioms; equivalent to 101 and 102.

**112 U 5, 10, 15**  
**Intensive Modern Literary Arabic**  
 Su. 15 cl. Enrollment limited to 25 students.  
 Prereq.: Permission of chairman.  
 Full time of student and full fees required.  
 Equiv. of 101, 102, and 601. Students with credit for 101 or the equiv. may not register for more than 10 hrs. Students with credit for 101 and 102 or the equiv. may not register for more than 5 hrs. Students with credit for 601 or the equiv. may not register for credit.  
 Elementary and intermediate literary Arabic; intensive drill in forms, syntax, vocabulary and idioms; reading of selected material in modern Arabic.

**193 U 1-15**  
**Individual Studies**  
 Su, A, W, Sp.  
 Prereq.: Permission of dept.  
 Repeatable to a maximum of 30 cr. hrs.

**194 U 1-15**  
**Group Studies**  
 Su, A, W, Sp.  
 Prereq.: Permission of dept.  
 Repeatable to a maximum of 30 cr. hrs.

**271 U 3**  
**Introduction to Arabic Literature in Translation**  
 A. 3 cl.  
 Prereq.: Engl. 100 or equiv.  
 A general survey of classical Arabic literature in its historical and cultural context.

**272 U 3**  
**Medieval Arabic Literature in Translation**  
 W. 3 cl.  
 Prereq.: Engl. 100 or equiv.  
 A general survey of the major genres, movements, and masterpieces of medieval Arabic literature; literary interrelationships in the west.

**273 U 3**  
**Modern Arabic Literature in Translation**  
 Sp. 3 cl.  
 Prereq.: Engl. 100 or equiv.  
 A general survey of modern Arabic literature, emphasizing the impact of western literary concepts.

**274 U 3**  
**Hispano-Arabic Literature in English Translation**  
 A. 3 cl.  
 Prereq.: Engl. 100 or equiv.  
 A general survey of Hispano-Arabic literature and culture; their relationship to the intellectual life in medieval Europe.

**401 U 5**  
**Intermediate Colloquial Arabic**  
 Sp. 5 cl.  
 Prereq.: 107.  
 Intensive practice in speaking Arabic with emphasis on various cultural aspects of Arab life.

**601 U G 5****Modern Literary Arabic I**

Sp. 5 cl.

Prereq.: 102.

Presentation of complex morphological forms and reintroduction and expansion of the basic syntactic structures of modern literary Arabic with readings on various aspects of Arabic culture.

**602 U G 5****Modern Literary Arabic II**

A. 5 cl.

Prereq.: 601.

Review of morphology and introduction of complex syntactic structures found in journalistic and formal expository writings.

**603 U G 5****Modern Literary Arabic III**

W. 5 cl.

Prereq.: 602.

Selected readings on a wide range of topics in a variety of genres and styles; practice in oral comprehension; conversation; and controlled composition.

**604 U G 5****Modern Literary Arabic IV**

Sp. 5 cl.

Prereq.: 603.

Continuation of Arabic 603.

**605 U G 5****Modern Literary Arabic V**

A. 5 cl.

Prereq.: 604.

Selected readings on social, political, economic, and intellectual aspects of Arab life; oral and written compositions on selected topics.

**608 U G 5****Classical Arabic I**

Sp. 5 cl.

Prereq.: 102.

Elements of Classical and Medieval Literary Arabic grammar; selected readings from Eastern Arabic literary works.

**609 U G 5****Classical Arabic II**

A. 5 cl.

Prereq.: 608.

Selected readings from Western (especially Spanish) Arabic literary works.

**611 U G 3****Introduction to the History of the Arabic Language**

W. 3 cl.

Prereq.: Permission of instructor.

A non-technical survey of the Arabic language in its social and historical setting. Cadara.

**621 U G 5****Contemporary Arabic Readings**

W. 5 cl.

Prereq.: 603.

Reading of contemporary expository prose selections on a variety of technical subjects such as politics, anthropology, religion, literature, language, and social mores. Cadara.

**622\* U G 5****Contemporary Arabic Short Stories**

Sp. 5 cl.

Prereq.: 603.

Reading of a selection of modern short stories by some of the representative writers in the Arab world. Cadara.

**623\* U G 5****Contemporary Arabic Poetry**

Sp. 5 cl.

Prereq.: 603.

Cadara.

**626 U G 5****Introduction to the Qur'an**

W. 5 cl.

Prereq.: 609.

A linguistic and cultural analysis of selected chapters from the Qur'an. Zwetler.

**627\* U G 5****Classical Arabic Poetry**

Sp. 5 cl.

Prereq.: 609.

Selected readings from classical and medieval Arabic poetry; Arabic metrics and literary theory. Zwetler.

**628\* U G 5****Classical Arabic Prose**

W. 5 cl.

Prereq.: 609.

Selected readings reflecting the evolution of Arabic prose literature from its origins to the Abbasid period. Zwetler.

**671 U G 3****The Koran in Translation**

A.

An introduction, in English, to the literary, religious, and cultural implications of the fundamental Book of Arabic literature and of Islamic civilization.

**694 U G 1-15****Group Studies in Arabic**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 30 cr. hrs.

**H783 U 3-5****Honors Course**

Su, A, W, Sp.

Prereq.: 4th yr. standing with a grade of A in at least half of the Arabic courses and an average of B in the remainder; permission of the instructor under whose supervision the work is to be completed and the Arts and Sciences Honors Committee.

Repeatable to a maximum of 15 cr. hrs.

At least 2 qtrs. are required of candidates for the degree Bachelor of Arts **with distinction** in Arabic. Failure to receive a mark of S in this course is a disqualification for special honors.

Offers undergraduates with special aptitudes a greater opportunity to do independent study and research than is possible in normal course work.

### 793 U G 1-5 Individual Studies in Arabic

A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

### 794 U G 1-15 Group Studies in Arabic

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 30 cr. hrs.

## Architecture

Office: 171 Brown Hall, 190 West 17th Avenue

**Professors** Borchers, Clark, Coddington, Korda, Phillian, Ronan (Emeritus), Tilley, Whitaker, and Wilson (Emeritus); **Associate Professors** Bowser, Brinkers, Dipner, Passe, and Young (Chairman); **Assistant Professors** Crane, Lee, Markwood, and Marzeki.

### 221 U 3 Architectural Graphics

A. 3 cl.

Open only to students enrolled in the School of Architecture.

Descriptive geometry and related applications of orthographic projection in architecture; lettering; perspective; shades and shadows. Markwood.

### 222 U 3 Construction Materials

W. 3 cl.

Open only to students enrolled in the School of Architecture.

Basic properties and production of architectural building materials; theory of working drawings and dimensioning; calculations and drawings of site work. Markwood.

### 223 U 3 Construction Methods

Sp. 3 cl.

Prereq.: 222.

Detailing of building sections, simple enclosures, and structural assemblies; analysis of acoustics. Markwood.

### 241 U 5 Architectural Design

A. 2 cl., 13 lab. hrs.

Open only to students enrolled in the School of Architecture. Not open to students with credit for 111.

Principles of perception, graphic communication, and form organization; composition in two and three dimensions.

### 242 U 5 Architectural Design

W. 2 cl., 13 lab. hrs.

Prereq.: 221 and 241.

Not open to students with credit for 112.

Use of color in graphic communication and form organization; functional and aesthetic arrangement of physical objects.

### 243 U 5 Architectural Design

Sp. 2 cl., 13 lab. hrs.

Prereq.: 242.

Not open to students with credit for 113.

Function and scale as factors in architectural design; expression and organization of spaces for human occupancy.

### 271 U 3 Drawing Studio for Architects and Landscape Architects

A. 5 lab. hrs.

Open only to students enrolled in the School of Architecture.

Intensive drawing experience with basic forms and simple media; development of sensitivity to visual.

### 272 U 3 Drawing Studio for Architects and Landscape Architects

W. 5 lab. hrs.

Prereq.: 271.

Continued intensive drawing experience; problems of increasing complexity; introduction of color, and of drawing the human figure. Crane.

### 273 U 3 Drawing Studio for Architects and Landscape Architects

Sp. 5 lab. hrs.

Prereq.: 272.

Continued intensive drawing experience; advanced drawing problems incorporating techniques and materials appropriate to professional study of architecture and landscape architecture. Crane.

### 321 U 3 Wood and Masonry Construction

A. 3 cl.

Prereq.: 243 and Engr. Mech. 206.

Not open to students with credit for 521.

Building loads; wood structural elements and their connections; masonry construction principles and procedures; foundations and footings; exercises in structural detailing and computations. Dipner.

### 322 U 3 Steel and Concrete Construction

W. 3 cl.

Prereq.: 321.

Not open to students with credit for 522.

Steel structural elements and their connections; trusses; reinforced concrete structural elements; exercises in structural detailing and computations. Dipner.

**323 U 3**  
**Application of Construction Principles**

Sp. 3 cl.  
 Prereq.: 322 and 663.  
 Not open to students with credit for 523.  
 Lectures, discussions, and field investigations of construction procedures; specifications; scheduling and estimating; site improvements. Dipner.

**341 U 5**  
**Architectural Design**

A. 2 cl., 13 lab. hrs.  
 Prereq.: 243; prereq. or concur. 321.  
 Not open to students with credit for 211.  
 Influence of the nature of materials and of technology on the design of objects, furnishings, and major architectural elements.

**342 U 5**  
**Architectural Design**

W. 2 cl., 13 lab. hrs.  
 Prereq.: 341; prereq. or concur. 322.  
 Not open to students with credit for 212.  
 Design of the building envelope; integration of interior spaces and exterior form and expression.

**343 U 5**  
**Architectural Design**

Sp. 2 cl., 13 lab. hrs.  
 Prereq.: 342; prereq. or concur. 661.  
 Not open to students with credit for 213.  
 Architectural expression of diverse and complex activities; relation of structure to spatial organization; expression of function and meaning in the building.

**393 U 1-5**  
**Individual Studies in Architecture**

Su, A, W, Sp.  
 Prereq.: Permission of School.  
 Repeatable to a maximum of 15 cr. hrs.  
 For students not majoring in Arch. who desire to pursue special studies in the field of Architecture.

**394 U 1-5**  
**Group Studies in Architecture**

Su, A, W, Sp.  
 Prereq.: Permission of School.  
 Repeatable to a maximum of 15 cr. hrs.  
 For students not majoring in Arch. who desire to pursue special studies in the field of Architecture.

**441 U 5**  
**Architectural Design**

A. 2 cl., 13 lab. hrs.  
 Prereq.: 343; prereq. or concur. 662.  
 Not open to students with credit for 511.  
 Site design; environmental influences on building form and location; vehicular circulation; building groups.

**442 U 5**  
**Architectural Design**

W. 2 cl., 13 lab. hrs.  
 Prereq.: 441; prereq. or concur. 663.  
 Not open to students with credit for 512.

Design of a major building emphasizing the integration of the functional, technical, and aesthetic aspects of design with particular attention to structure, environmental control, and mechanical circulation.

**443 U 5**  
**Architectural Design**

Sp. 2 cl., 13 lab. hrs.  
 Prereq.: 442; prereq. or concur. 323.  
 Not open to students with credit for 513.  
 Recognition of community forces affecting architectural form; expression of social and cultural values; integration of new buildings with existing neighborhoods; selection among competing design values.

**601 U 3**  
**History of Ancient Architecture**

A. 3 cl.  
 Analysis of primitive structures and ancient architecture before the Christian era to illustrate basic principles of shelter, natural building techniques, and organization of space. Borchers.

**602 U 3**  
**History of Medieval and Renaissance Architecture**

W. 3 cl.  
 Analysis of architecture from the early Christian era through the Baroque, related to the spirit of the age, social organization, and increasing structural knowledge. Borchers.

**603 U 3**  
**History of Contemporary Architecture**

Sp. 3 cl.  
 Analysis of architecture from the Industrial Revolution to the present, reflecting changes of society, fashion and architectural practice; new materials and structural techniques. Borchers.

**661 U 3**  
**Lighting and Electrical Equipment in Architecture**

Sp. 3 cl.  
 Prereq.: Physics 112.  
 Lighting fundamentals; light sources and their characteristics; lighting applications; electricity and electrical circuits; electrical materials and installation methods; exercises in design of electrical wiring. Passe.

**662 U 3**  
**Space Conditioning in Architecture**

A. 3 cl.  
 Prereq.: Physics 112.  
 Environmental comfort; heat loss and gain; principles of heating and cooling; space conditioning; heating by electricity. Passe.

**663 U 3**  
**Mechanical Systems in Architecture**

W. 3 cl.  
 Prereq.: Physics 112.  
 Air handling systems; direct space conditioning; fire protection; water and plumbing systems; principles of storm and sanitary drainage; waste treatment; cleaning and disposal systems. Passe.

**689 U 2****Inspection Trip**

Sp.

Prereq.: Arch., or Land. Arch., 3rd or 4th yr. standing.  
Taken between Winter and Spring Quarters; trip to inspect architects' offices and buildings in Ohio and neighboring states; written report required.

**693 U G 1-5****Individual Studies in Architecture**

Su, A, W, Sp.

Prereq.: Permission of School.

Repeatable to a maximum of 15 cr. hrs.

For students majoring in Arch. desiring to pursue special studies not offered in the fixed curriculum.

**694 U 1-5****Group Studies in Architecture**

Su, A, W, Sp.

Prereq.: Permission of School.

Repeatable to a maximum of 15 cr. hrs.

For students majoring in Arch. desiring to pursue special studies not offered in the fixed curriculum.

**700 U G 3****Allied Arts**

A. 3 cl.

Prereq.: Arch. 4th yr. standing or admission to grad. curriculum in Arch. or permission of instructor.

Analysis of arts related to architecture and the expression of the nature of materials in architectural ornament, furniture and furnishings, and the garden. Borchers.

**724 U G 5****Structural Design in Architecture**

W. 5 cl.

Prereq.: Admission to grad. curriculum in Arch. or permission of instructor.

Steel structural systems; analysis and design of components by current specifications; inelastic behavior of continuous frames; connections and fabrication limitations. Korda.

**725 U G 5****Structural Design in Architecture**

Sp. 5 cl.

Prereq.: 724.

Reinforced concrete structural systems analysis and design of continuous frameworks by ultimate strength specifications, including deformations; prestressed concrete systems. Korda.

**751 U G 3****Practice of the Design Professions**

A. 3 cl.

Prereq.: Admission to grad. curriculum in Arch. or permission of instructor.

History of professions and their clients; the professional's interaction with society and government; substantive aspects of practice, including organization and communication; legal aspects of construction. Clark.

**752 U G 3****Practice of the Design Professions**

W. 3 cl.

Prereq.: Admission to grad. curriculum in Arch. or permission of instructor.

Management of construction contracts; bonds and insurance; operational procedures during negotiation and construction phases; arbitration; office and project case studies. Clark.

**801 G 2****Seminar**

A. 2 cl.

Prereq.: Admission to grad. curriculum in Arch. or permission of instructor.

Seminars and related research on contemporary problems, issues, and concerns in architectural theory and practice.

**802 G 2****Seminar**

W. 2 cl.

Prereq.: Admission to grad. curriculum in Arch. or permission of instructor.

Continuation of 801.

**803 G 2****Seminar**

Sp. 2 cl.

Prereq.: Admission to grad. curriculum in Arch. or permission of instructor.

Continuation of 802.

**831 G 5****Construction Systems Design**

A, W, Sp. 3 cl., 10 lab hrs.

Prereq.: Admission to grad. curriculum in Arch. or permission of instructor.

Comparative study of the behavior of construction systems; properties and specifications of systems materials; interface consequences of complex assemblies; industrialized buildings. Clark.

**832 G 5****Construction Systems Design**

A, W, Sp. 3 cl., 10 lab. hrs.

Prereq.: 831.

Methodology of design programming; processes for solving complex functional relationships; design decision-making and management tools; network planning and scheduling; communication.

**833 G 5****Construction Systems Design**

A, W, Sp. 3 cl., 10 lab. hrs.

Prereq.: 832.

Systems product and component development; dynamic, major institutional or industrial project; structural modeling.

**834 G 5****Advanced Construction Systems Design**

A, W, Sp. 3 cl., 10 lab. hrs.

Prereq.: 833.

Sub-systems design at building scale; detailed behavior considerations of structure, enclosure, comfort and safety sub-systems.

**835 G 5**  
**Advanced Construction Systems Design**

A, W, Sp. 3 cl., 10 lab. hrs.

Prereq.: 834.

Production as design feedback, materials handling, processing, assembly, distribution and installation; macrosystems, utilities, transportation.

**836 G 5**  
**Advanced Construction Systems Design**

A, W, Sp. 3 cl., 10 lab. hrs.

Prereq.: 835.

Obligations to systems users, society and the environment; optimization, economic justification; summary project of urban proportions.

**841 G 5**  
**Advanced Architectural Design**

A, W, Sp. 15 lab. hrs.

Prereq.: Admission to grad. curriculum in Arch. or permission of Graduate Committee.

Not open to students with credit for 811.

Studies in design methods stressing coordination and expression of technical requirements, human needs and values, and aesthetic qualities; application in architectural projects of considerable complexity and scope.

**842 G 5**  
**Advanced Architectural Design**

A, W, Sp. 15 lab. hrs.

Prereq.: 841.

Not open to students with credit for 812.

Continuation of 841; development of projects requiring a high level of aesthetic attainment.

**843 G 5**  
**Advanced Architectural Design**

A, W, Sp. 15 lab. hrs.

Prereq.: 842.

Not open to students with credit for 813.

Continuation of 842; design of projects requiring integration with other disciplines.

**844 G 5**  
**Advanced Architectural Design**

A, W, Sp. 15 lab. hrs.

Prereq.: 15 cr. hrs. in grad. arch. design.

Repeatable to a maximum of 15 cr. hrs.

Advanced studies and individual research; development of independent design projects.

**899 G 1-5**  
**Interdepartmental Seminar**

Su, A, W, Sp.

(See under Interdepartmental Seminars.)

**993 G 1-5**  
**Individual Studies in Architecture**

A, W, Sp.

Prereq.: Grad. standing.

Repeatable to a maximum of 15 cr. hrs.

**993.01 Environmental Design**

**993.02 Construction Systems and Technology**

**993.03 Architectural History and Criticism**  
**993.04 Management and Professional Practice**  
**993.05 Architectural Photogrammetry**  
**993.06 Architectural Education**  
**993.07 Otherwise Unclassified**

**994 G 1-5**  
**Group Studies in Architecture**

A, W, Sp.

Prereq.: Grad. standing.

Repeatable to a maximum of 15 cr. hrs.

**994.01 Environmental Design**

**994.02 Construction Systems and Technology**

**994.03 Architectural History and Criticism**

**994.04 Management and Professional Practice**

**994.05 Architectural Photogrammetry**

**994.06 Architectural Education**

**994.07 Otherwise Unclassified**

**999 G Arr.**  
**Research in Architecture**

Su, A, W, Sp.

Research for thesis purposes only.

## Art

Office: 146 Hopkins Hall, 128 North Oval Drive

**Professors** Ruzicka (Chairman), Baughman, Black, Chafetz, Csuri, Freeman, Friley, R. Gatrell, Hall, King, and Sherman; **Associate Professors** Fistick, M. Gatrell, Hebner, Krueger, Krumm, and Wynne; **Assistant Professors** Heintze, Katz, Schwartz, and Wright; **Instructors** Camp, Chipperfield, Farley, Gunderson, Kolbensschlag, Lawson, Raabe, Sacco, Shineman, and Tomlinson.

**170 U 5**  
**Studio Art I**

A, Sp. 5 2-hr. labs., 1 lec.

Open only to majors in the Divisions of Art, Art Education, Design, and History of Art, and to majors in Medical Illustration, except by permission of the Division of Art chairman.

An introductory studio experience relating to visual fundamentals; lectures, discussions, demonstrations, and field trips.

**171 U 5**  
**Studio Art II**

A, W. 5 2-hr. labs.

Prereq.: 170 or permission of instructor.

Continued studio experience of the underlying principles utilized in 170; lectures, discussions, demonstrations, and field trips.

**175 U 5****Studio Art III**

W, Sp. 5 2-hr. labs.

Prereq.: 171.

Continued studio experience emphasizing visual fundamentals utilized in 170 and 171 as applied to diverse art forms; lectures, discussions, demonstrations, and field trips.

**180 U 5****Sculpture**

Su, A, W, Sp.

Prereq.: 170.

Open only to majors in the Divisions of Art, Art Education, Design, and History of Art, and to majors in Medical Illustration, except by permission of the Division of Art chairman.

Not open to students with credit for 581.

An introduction to the principles of sculpture, emphasizing basic forming processes and materials.

**190 U 3****Introduction to Fine Art Activities**

Su, A, W, Sp. 1 cl., 4 lab. hrs.

Not open to candidates for the degrees B.F.A. and B.S. in Ed. with Art, Design, or Hist. of Art as a major, nor to students with credit for 170 or 290, or Fine Arts 170, 190, or 290.

An investigation of visual form, its perception, development, and use through studio experience.

**240 U 3****Elementary Ceramic Art**

Su, A, W, Sp. 1 cl., 6 lab. hrs.

Introduction to the art phases of the ceramic field; laboratory practice in the hand forming process.

**242 U 3****Introduction to Ceramic Art**

Su, A, W, Sp. 1 cl., 6 lab. hrs.

Prereq.: 240 or majors in Art, Art Ed., Design, or Hist. of Art.

Introduction to the Ceramic Arts through the use of the potter's wheel with lectures covering a broad survey of the field of ceramics.

**244 U 3****Ceramic Art Laboratory I**

Su, A, W, Sp. 9 lab. hrs.

Prereq.: 242 or permission of instructor.

Laboratory practice utilizing the potter's wheel as a basis for more involved forming processes.

**245 U 5****Ceramic Art Laboratory II**

A, W, Sp. 15 lab. hrs.

Prereq.: 244 or permission of instructor.

Not open to students with credit for Fine Arts 245.

Laboratory practice in designing ceramic wares with emphasis on the hand forming processes.

**246 U 3****Ceramic Art Laboratory III**

Su, A, W, Sp. 9 lab. hrs.

Prereq.: 245 or permission of instructor.

Not open to students with credit for Fine Arts 246.

**272 U 5****Life Drawing I**

Su, A, W, Sp. 5 3-hr. labs.

Prereq.: 175 and 180.

Drawing from the human figure; discussion of drawing as related to significant traditions; lectures, demonstrations.

**273 U 5****Painting I**

Su, A, W, Sp. 5 3-hr. labs.

Prereq.: 175 and 180.

Special problems in painting on intermediate level of visual experience, related to current and traditional directions, styles, techniques, and media; lectures, discussions, demonstrations, and field trips.

**274 U 5****Studio Art IV**

Sp. 5 3-hr. labs.

Prereq.: 272.

An intermediate level drawing-color experience exploring a variety of media and directions; lectures, discussions, demonstrations.

**276 U 5****Introduction to Printmaking**

Su, A, W, Sp. 5 2-hr. labs.

Prereq.: 171.

The basic tools, methods, and materials of printmaking; study and examination of original prints.

**280 U 5****Construction Sculpture**

A, W, Sp. 3 3-hr. labs., 6 hrs. arr.

Prereq.: 175 and 180.

Study of three-dimensional form through the use of power and hand tools.

**281 U 5****Modeling and Carving**

Sp. 3 3-hr. labs., 6 hrs. arr.

Prereq.: 175 and 180.

An intermediate studio course dealing with modeled and carved sculpture in media such as clay, wax, wood, plaster, and stone.

**282 U 5****Life Sculpture**

A, W. 3 3-hr. labs., 6 hrs. arr.

Prereq.: 175, 180, and 272.

Aspects of the human form studied in relation to the materials of sculpture; experimentation in a choice of materials: clay, wax, cement, plaster, and metal.

## 290 U 5

### Fundamentals of Art

Su, A, W, Sp. 5 2-hr. labs.

Not open to majors in Art, Art Educ., Design, or Hist. of Art.

An introduction to art through studio experience, exploring two-dimensional and three-dimensional media, by an analysis of form, and expression.

## 294 U 5

### Group Studies

A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Group studies for students in specialized programs.

## 295† U 3

### Drawing

A. 6-hr. lab.

Prereq.: Arch. 2nd yr. standing.

Visual fundamentals as expressed through drawings; emphasis upon configuration and visual relationships.

## 296† U 3

### Drawing from Life

W. 6-hr. lab.

Prereq.: Arch. 2nd yr. standing and 295.

Drawing from the human figure, study of gesture and planar relationships in two and three dimensional space.

## 297† U P 3

### Form Organization

A, Sp. 3 2-hr. labs.

Prereq.: Dent. 1st yr. standing or Arch. 2nd yr. standing.

Drawing and sculpture, with emphasis on visual organization.

## 376 U 5

### Beginning Relief Printmaking

A, W. 5 2-hr. cl., 5 hrs. arr.

Prereq.: 276.

Open only to Art or Art Educ. majors or by permission of Division Chairman.

Introduction to the practice and examination of several modes of artistic expression in the relief processes of printmaking.

## 377 U 5

### Beginning Serigraphy

A, W. 5 2-hr. cl., 5 hrs. arr.

Prereq.: 276.

Open only to Art and Art Educ. majors or by permission of Division Chairman.

Introduction to the practice and examination of several modes of artistic expression in the serigraphic processes of printmaking.

## 378 U 5

### Beginning Intaglio Printmaking

A, W. 5 2-hr. cl., 5 hrs. arr.

Prereq.: 276.

Open only to Art or Art Educ. majors or by permission of Division Chairman.

Introduction to practice and examination of several modes of artistic expression in the intaglio processes of printmaking.

## 379 U 5

### Beginning Lithography

A, W. 5 2-hr. cl., 5 hrs. arr.

Prereq.: 276.

Open only to Art or Art Educ. majors or by permission of Division Chairman.

Introduction to the practice and examination of several modes of artistic expression in the lithographic processes of printmaking.

## 441 U 3

### Ceramic Composition

A. 2 cl., 2 2-hr. labs.

Ceramic computations course for art students; methods of representing ceramic composition; laboratory study and discussion of raw materials and their uses in bodies and glazes.

## 442 U 3

### Ceramic Composition

W. 2 cl., 2 2-hr. labs.

Prereq.: 441.

Laboratory practice in development of the aesthetic aspects of ceramic glazes and bodies; methods of presenting their fired composition and correction faults.

## 443 U 3

### Ceramic Composition

Sp. 2 cl., 2 2-hr. labs.

Prereq.: 442.

Laboratory study and development of individual projects leading to creation of ceramic compositions of aesthetic merit; further studies in texture and color.

## 468 U 5

### Elements of Weaving

A, W, Sp. 5 2-hr. labs.

Prereq.: 290 or Design 251 or permission of instructor.

An introduction to the creative and functional aspects of handweaving; experience in the construction, warping, threading, and the manipulation of both standard and modern design techniques.

## 469† U 3

### Weaving

A, W, Sp. 3 2-hr. labs.

Prereq.: 468.

The use of weaving materials and equipment, with an emphasis on creative design of functional and decorative fabrics.



**550 U 3**  
**Development of Interior Design I**

A. 3 cl.

Prereq.: History of Art 210, 211, and 212.

A survey of European interiors from 1300 to 1850, followed by a study of French design from Louis XIII through the Empire period.

**551 U 3**  
**Development of Interior Design II**

W. 3 cl.

Prereq.: 550.

A study of the Tudor, Jacobean, Carolean, Georgian, and Regency Periods—considering the aesthetic, political, and economic implication.

**552 U 3**  
**Development of Interior Design III**

Sp. 3 cl.

Prereq.: 551.

A survey of American interiors since 1650, followed by a study of the development of interior design in the western world since 1880; field trips.

**570 U 5**  
**Life Drawing II**

Su, A, W, Sp. 5 3-hr. labs.

Prereq.: 272.

Development of a comprehensive understanding and use of the human figure as an element related to pictorial organization; discussions, lectures, demonstrations, and field trips.

**573 U 5**  
**Painting II**

Su, A, W, Sp. 5 3-hr. labs.

Prereq.: 272 and 273.

Advanced problems in painting with emphasis upon exploring diverse media and directions; lectures, discussions, demonstrations, and field trips.

**580 U G 5**  
**Ceramic Sculpture**

W. 3 3-hr. labs., 6 hrs. arr.

Prereq.: 281.

An advanced level studio course dealing with various methods of building and firing clay sculpture; emphasis on clay's unique structural and forming possibilities.

**581 U G 5**  
**Welded and Forged Sculpture**

Sp. 3 3-hr. labs., 6 hrs. arr.

Prereq.: 280 and 281.

An introduction to metal construction in sculpture by oxyacetylene welding, arc welding, and forming methods with forge and hammer.

**582 U G 5**  
**Sculpture Foundry**

A. 3 3-hr. labs., 6 hrs. arr.

Prereq.: 280, 281, and 282.

An introduction to traditional and experimental methods used in the development and casting of sculpture; experience in the operation of foundry material and equipment.

**591 U 2-5**  
**Studio Practice I**

Su, A, W, Sp.

Prereq.: Permission of instructor.

The following decimal subdivisions, with the exception of 591.12, are open only to juniors and seniors majoring in Art.

Each decimal subdivision repeatable to a maximum of 20 cr. hrs.

Intermediate studio practice, following and continuing the basic program of courses undertaken in the first two years.

**591.03 Ceramics**

**591.06 Graphics**

**591.07 Weaving**

**591.09 Drawing**

**591.10 Painting**

**591.11 Sculpture**

**591.12 Expanded Arts**

**640 U G 5**  
**Studio Kilns and Firing Practices**

Sp. 15 lab. hrs.

Prereq.: Permission of instructor.

The design, construction, and use of simple gas and electric ceramic studio kilns; practice in the various types and methods of firing.

**641 U G 5**  
**Ceramic Reproduction Processes**

W. 15 lab. hrs.

Prereq.: Permission of instructor.

Studies in the designing, fabrication, and uses of models and molds in such multiple ceramic production processes as casting, jiggering, and pressing.

**642 U G 5**  
**Advanced Ceramic Laboratory**

A. 15 lab. hrs.

Prereq.: Permission of instructor.

Design and construction of large ceramic art forms.

**647 U G 3**  
**Survey of Ceramic Form and Technique**

Sp. 3 cl.

Prereq.: Permission of instructor.

Slide lectures; designed specifically to give the student potter an understanding of historical forms and technical progresses; presented in chronological sequence.

**670 U G 5****Comprehensive Drawing**

A, Sp. 5 3-hr. labs.

Prereq.: 272.

Special problems in drawing with an emphasis upon exploring diverse directions, utilizing a variety of media, materials, and techniques; lectures, discussions, and demonstrations.

**676 U G 5****Advanced Relief Printmaking**

Sp. 5 3-hr. cl.

Prereq.: 376.

Open only to Art or Art Educ. majors or by permission of Division Chairman.

An intensive exploration of the relief processes as a means for individual expression.

**677 U G 5****Advanced Serigraphy**

W. 3 3-hr. labs., 6 hrs. arr.

Prereq.: 377 or permission of Division Chairman.

Open to grad. students with 15 cr. hrs. in drawing and painting.

An intensive exploration of the serigraphic processes as a means for individual expression.

**678 U G 5****Advanced Intaglio**

A. 3 3-hr. labs., 6 hrs. arr.

Prereq.: 378 or permission of Division Chairman.

Open to grad. students with 15 cr. hrs. in drawing and painting.

An intensive exploration of the intaglio process as a means for individual expression.

**679 U G 5****Advanced Lithography**

Sp. 5 3-hr. cl.

Prereq.: 379 or permission of Division Chairman.

An intensive exploration of the lithographic processes as a means for individual expression.

**680† U G 5****Large Sculpture Projects**

Sp. 5 3-hr. labs.

Prereq.: 280 and 281.

An advanced level studio course dealing with large-scale sculpture constructed in relation to architecture.

**681 U G 5****Advanced Figurative Sculpture**

A, W. 3 3-hr. labs., 6 hrs. arr.

Prereq.: 281 and 282.

An advanced level studio course dealing with individual study of the relationship of sculpture to the model; various media.

**691 U G 2-5****Studio Practice II**

Su, A, W, Sp.

Prereq.: Permission of instructor.

The following decimal subdivisions, with the exception of 691.12, are open only to grad. students or seniors majoring in Art.

Each decimal subdivision repeatable to a maximum of 20 cr. hrs.

Advanced studio practice beyond 591.

**691.03 Ceramics**

**691.06 Graphics**

**691.07 Weaving**

**691.09 Drawing**

**691.10 Painting**

**691.11 Sculpture**

**691.13 Interior Design**

**691.12 Expanded Arts**

**693 U G 2-5****Individual Studies**

Prereq.: Permission of instructor.

Each decimal subdivision repeatable to a maximum of 45 cr. hrs.

Advanced study for students in specialized programs.

**693.03 Ceramics**

Su, A, W, Sp.

**693.06 Graphics**

Su, A, W, Sp.

**693.07 Weaving**

A, W, Sp.

**693.09 Drawing**

Su, A, W, Sp.

**693.10 Painting**

Su, A, W, Sp.

**693.11 Sculpture**

Su, A, W, Sp.

**693.12 Expanded Arts**

Su, A, W, Sp.

**694 U G 2-5****Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Each decimal subdivision repeatable to a maximum of 15 cr. hrs.

Group studies for students in specialized programs.

**694.03 Ceramics**

**694.06 Graphics**

**694.07 Weaving**

**694.09 Drawing**

**694.10 Painting**

**694.11 Sculpture**

**694.12 Expanded Arts**

**695 U G 2****Professional Problems and Issues for Studio Artists I**

A. 1 2-hr. cl.

A seminar dealing with teaching disciplines and research specializations of studio faculty and faculty from related areas of study.

**696 U G 2****Professional Problems and Issues  
for Studio Artists II**

Sp. 1 2-hr. cl.

Current events, directions, and movements in art.

**698 U G 5-15****Study Tour in Art**

A, W, Sp.

Prereq.: 175 and 180 or permission of instructor.

First hand investigation of source material to be found abroad: including meetings and discussions with international members of the art community.

**879 G 2****Perception-Art Form Seminar**

W. 2 cl.

Seminar utilizing the Ames Visual Demonstration Center as a basis for discussion of perception and aesthetic form. Sherman.

**881 G 3-5****Advanced Sculpture**

A.

Advanced sculpture with a wide range of choice in media.

**885 G 3-5****Advanced Sculpture**

W.

Prereq.: 881.

Continuation of 881.

**887 G 3-5****Advanced Sculpture**

Sp.

Prereq.: 885.

Continuation of 885.

**891 G 2-5****Studio Practice III**

Su, A, W, Sp.

Prereq.: Grad. standing in Art or permission of instructor.

Each decimal subdivision repeatable to a maximum of 45 cr. hrs.

Graduate-level studio practice.

- 891.03 Ceramics**
- 891.06 Graphics**
- 891.09 Drawing**
- 891.10 Painting**
- 891.11 Sculpture**
- 891.12 Expanded Arts**

**940 G 3-5****Research Problems in Ceramics**

Su, A, W, Sp.

Repeatable to a maximum of 45 cr. hrs.

**971 G 3-5****Research Problems in Printmaking**

A, W, Sp.

Repeatable to a maximum of 45 cr. hrs.

**980 G 3-5****Research Problems in Sculpture**

Su, A, W, Sp.

Repeatable to a maximum of 45 cr. hrs.

**991 G 2-5****Studio Practice IV**

Su, A, W, Sp.

Prereq.: Grad. standing in Art or permission of instructor.

Each decimal subdivision repeatable to a maximum of 45 cr. hrs.

Advanced graduate studio practice.

- 991.03 Ceramics**
- 991.06 Graphics**
- 991.09 Drawing**
- 991.10 Painting**
- 991.11 Sculpture**
- 991.12 Expanded Arts**

**993 G 1-5****Individual Studies**

Each decimal subdivision repeatable to a maximum of 45 cr. hrs.

- 993.03 Ceramics**  
Su, A, W, Sp.
- 993.06 Graphics**  
Su, A, W, Sp.
- 993.10 Painting**  
Su, A, W, Sp.
- 993.11 Sculpture**  
Su, A, W, Sp.
- 993.12 Expanded Arts**  
Su, A, W, Sp.

**994 G 1-5****Group Studies**

A, W, Sp.

Prereq.: Permission of instructor.

Each decimal subdivision repeatable to a maximum of 15 cr. hrs.

Group studies for students in specialized programs.

- 994.03 Ceramics**
- 994.06 Graphics**
- 994.10 Painting**
- 994.11 Sculpture**
- 994.12 Expanded Arts**

**999 G Arr.****Research in Art**

Su, A, W, Sp.

Research for thesis and dissertation purposes only.

## Art Education

Office: 340 Hopkins Hall, 128 North Oval Drive

**Associate Professor** Marantz (Chairman); **Professors** Efland and Severino; **Associate Professors** Duncan, Kern, and Orr; **Assistant Professors** Arnold, Cardinale, Clark, and Norris; **Instructors** Barrett and Linehan.

### 160 U 5

#### The Arts in Contemporary America

A, W, Sp. 4 cl., 1 lab. hr.

(Cross-listed in the Div. of Dance and the School of Music.)

A study of the role of the arts in American society based on live, recorded and filmed performances and exhibitions.

### 200 U 4

#### Orientation to Art Education

A, W, Sp. 2 cl., 2 2-hr. labs.

Prereq.: 2nd yr. standing.

Not open to students with credit for Fine Arts 200.

Historical and current issues in art education, laboratory experience in preparing teaching materials, tryout and assessment of teaching skills.

### 210 U 5

#### Beginning Jewelry and Metalsmithing

A, W, Sp. 5 2-hr. cl., 5 hrs. arr.

Prereq.: 15 cr. hrs. in Art studio courses or permission of instructor.

Fundamental knowledge of and processes for manipulating metals for the design and creation of jewelry and metalwork.

### 401 U 5

#### Laboratory and Field Experience in Art Education

A, W. 5 3-hr. labs.

Prereq.: 200, Ed. P. standing, and successful completion of 5 studio courses.

Not open to students with credit for Fine Arts 401.

Laboratory problems for the teaching of art studio criticism and history; supervised field experience as teacher aide in an elementary school.

### 402 U 5

#### Laboratory and Field Experience in Art Education

W, Sp. 5 3-hr. labs.

Prereq.: 401.

Not open to students with credit for Fine Arts 402.

Laboratory problems for teaching of art studio criticism and history; supervised field experience in recreation centers or settlement houses.

### 500 U 3

#### Art for Elementary Teachers

Su, A, W, Sp. 3 2-hr. labs.

Prereq.: Art 290 or Fine Arts 290.

Not open to students with credit for Fine Arts 500.

Problems of teaching in terms of personal knowledge about art, insight into children's art work, and understanding of elementary school curriculum.

### 501 U G 4

#### Art Workshop for Elementary Teachers

Su.

Prereq.: Elem. Ed. 4th yr. standing.

Full time of student for 3 wks.

Not open to students with credit for Fine Arts 501.

Laboratory experiences with art media toward understanding the visual arts; study of children's art expression; problems of teaching the arts in the elementary school program.

### 586 U 3-8

#### Student Teaching in Art in Elementary Schools

A, W, Sp.

Repeatable to a maximum of 10 cr. hrs.

Practical and theoretical study in educational settings working with elementary school-age children and cooperating teachers.

### 587 U 3-8

#### Student Teaching in Art in Secondary Schools

A, W, Sp.

Repeatable to a maximum of 10 cr. hrs.

Practical and theoretical study in educational settings working with secondary school-age students and cooperating teachers.

### 594 U G 1-5

#### Group Studies

Su, A, W, Sp.

Prereq.: 200 or permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Group studies in professional areas of specified content.

### 603 U G 4

#### Theory of Art Education

A, W, Sp. 5 cl.

Prereq.: 402, Ed: C & F 435, and Ed: E & MC 461.

Not open to students with credit for Fine Arts 603.

A consideration of the formal and informal theories in art education, with emphasis on building a theoretical basis for education in the arts.

### 604 U G 3-5

#### Multi-Media Materials Development for Art Education

Su, A, W, Sp.

Development and presentation of instructional packages for art education; practical audio-visual instruction and theory of teaching materials development in the context of a multi-media laboratory.

### 610 U G 5

#### Advanced Jewelry and Metalsmithing

W, Sp. 5 2-hr. cl., 5 hrs. arr.

Prereq.: 210 or permission of instructor.

Extends the skills in manipulating metals and the concepts of designing and executing jewelry and metalwork.

### 691 U G 2-5

#### Applied Research in Art Education

Su, A, W, Sp.

Repeatable to a maximum of 10 cr. hrs.

Studies in empirical, philosophical, curriculum or studio problems in Art Education.

### 693 U G 2-5

#### Individual Studies

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 45 cr. hrs.

Advanced study for students in specialized programs.

**694 U G 2-5****Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Group studies for students in specialized programs.

**804 G 3-5****Issues in Art Education**

A.

An introduction to alternative conceptions of the functions of art education within the content of general education and the contemporary culture milieu.

**805 G 3-5****Empirical Problems in Art Education**

W.

An introduction to the language, methodology, and application of empirical research in art education; the identification and isolation of appropriate empirical problems in the field.

**806 G 3-5****Philosophical Problems in Art Education**

W.

A study of the conceptual difficulties encountered when initiating and carrying out philosophical investigations in the field of art education.

**807 G 3-5****Curriculum Problems in Art Education**

Sp.

An examination of the functions of curricular plans as tools for transforming selected conceptions of art education into teacher and student activities in the classroom.

**911 G 3-5****Research Problems in Art Education**

Su, A, W, Sp.

Repeatable to a maximum of 45 cr. hrs.

**993 G 1-5****Individual Studies**

Su, A, W, Sp.

Repeatable to a maximum of 45 cr. hrs.

**994 G 1-5****Group Studies**

Su, A, W, Sp.

Repeatable to a maximum of 15 cr. hrs.

Group studies for students in specialized programs.

**998 G Arr.****Research in Art Education: Thesis**

Su, A, W, Sp.

Research for thesis purposes only.

**999 G Arr.****Research in Art Education: Dissertation**

Su, A, W, Sp.

Research for dissertation purposes only.

**Arts and Sciences****294 U 3-5****Interdisciplinary Group Studies**

Su, A, W, Sp.

H294 (Honors) may be available to students enrolled in a college Honors Program or by permission of dept.

Prereq.: Open to students who meet instructor's stated prerequisites.

Repeatable to a maximum of 15 cr. hrs.

Study of special or interdisciplinary topics at an introductory level.

**594 U 3-5****Interdisciplinary Group Studies**

Su, A, W, Sp.

H594 (Honors) may be available to students enrolled in a college Honors Program or by permission of dept.

Prereq.: Open to students who meet instructor's stated prerequisites.

Repeatable to a maximum of 15 cr. hrs.

Study of special or interdisciplinary topics at an intermediate level.

**605† U G 5****Foundations of Contemporary Civilization**

A.

A study of the major movements of thought in science, social philosophy, the humanities, and religion in the development of Western civilization. Brown.

**608 U G 5****Development of Modern Science**

Su. 5 cl.

Prereq.: 4th yr. standing.

The nature of science and its place in human culture as revealed by detailed sequences of discovery from the history of its development. LaRocque.

**H750 U G 15****Arts and Sciences—Graduate Course**

Su, A, W, Sp.

Prereq.: Sr. standing and admission to the Arts and Sciences—Graduate Combined Program.

Repeatable to a maximum of 75 cr. hrs.

A progress grade will be given at the end of each quarter. At the conclusion of the program, course credits and final grades will be assigned.

Registration in this course constitutes full-time enrollment, unless otherwise specified.

A program leading to the simultaneous award of the Bachelor of Arts and Master of Arts degrees.

## Astronomy

Offices: 5040 Smith Laboratory of Physics, 174 West 18th Avenue; Perkins Observatory, Delaware, Ohio

**Professors** Slettebak (Chairman), Bobrovnikoff (Emeritus), Capriotti, Collins, Czyzak, Keenan, Keller, Ko, Kraus, Mitchell, and Protheroe; **Associate Professors** Roark, and Wing; **Assistant Professors** Byard, Ehman, and Newsom.

### 150 U 5 Descriptive Astronomy

Su, A, W, Sp.

Not open to students with credits for 101, 102, 191 or 192.

An introductory course emphasizing the place of astronomy in man's cultural and scientific development.

### 191 U 5 General Astronomy I

A. Lec./Lab.

Prereq. or concur.: Math. 150 or equiv. or permission of instructor.

Not open to students with credit for 101 or 150.

Astronomy 191 and 192 form a comprehensive introduction to modern astronomy; 191 deals with the solar system and the earth as an astronomical body.

### 192 U 5 General Astronomy II

W. Lec./Lab.

Prereq.: Either 101, 191 or permission of instructor.

Not open to students with credit for 102 or 150.

A continuation of 191 with emphasis on the stellar universe and physical astronomy.

### 300 U 3 Spherical Astronomy

W.

Prereq.: Either 101, 150, 191, or equiv.; Math. 254; and Physics 112 or 131, or 231; or permission of instructor.

Not open to students with credit for 611.

The application of spherical trigonometry to stellar positions and motions; stellar coordinate systems; time; fundamental measurements of star positions.

### 301 U 3 Observational Astronomy

Sp. Lec./Lab.

Prereq.: 102 or 192 or written permission of instructor.

Selected intermediate level experiments and observations for the obtaining and treatment of astronomical data.

### 601†\* U G 3 History of Astronomy

W.

Prereq.: Either 101, 102, 191, 192, 150, or permission of instructor.

Babylonian, Egyptian, Chinese, and Mayan Astronomy; Graeco-Roman period and Middle Ages; Renaissance and Reformation; modern trends in Astronomy.

### 605\* U G 3 Introduction to Celestial Mechanics

W.

Prereq.: Math. 255 or 556; and Physics 525; or permission of instructor.

Application of the laws of motion to planets, satellites, and stars; the two-, three-, and N- body problems; introduction to orbit and perturbation theory.

### 650 U G 4 Stellar Astronomy

A.

Prereq.: Either 102, 192, or 150; Math 254; Physics 232 and 233 or 132 and 133; or permission of instructor.

Distances, motions, luminosities, and masses of stars; the motions and distribution of stars and interstellar matter; star clusters and galaxies.

### 651 U G 4 Introduction to Astrophysics

W.

Prereq.: Math. 255 or 566; prereq. or concur. Physics 580.01 or 705; or equiv.; or permission of instructor.

Study of radiation from stars and nebulae to determine the composition and physical conditions of matter in and between the stars; stellar nuclear energy sources.

### 652 U G 4 Solar System

Sp.

Prereq.: 101 or 191 or 150 and 651; or permission of instructor.

The physical nature of the solar surface, planets, satellites, comets, asteroids, meteors, and diffuse matter in the solar system; cosmogony of the solar system.

### 689\* U G 3 Astronomical Uses of Applied Mathematics

A.

Prereq.: Math. 255 or permission of instructor.

Application of numerical methods for solution of integral, differential, and linear equations of particular interest to astronomy; treatment of aspects of statistics of particular relevance to astronomy.

### 693 U G 1-15 Individual Studies

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 40 cr. hrs.

Independent library or laboratory work on a special problem in observational or theoretical astronomy.

### 694 U G 1-5 Group Studies

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Designed to give groups of students an opportunity to pursue special studies not otherwise offered.

**H783 U 3-5****Honors Course**

Su, A, W, Sp.

Prereq.: 4th yr. standing with a grade of A in at least half of the Astronomy courses taken, with an average of B in the remainder; permission of instructor under whose supervision the work is to be completed and the Arts and Sciences Honors Committee. At least 2 qtrs. are required of candidates for the degree B.A. or B.S. **with distinction** in Astronomy. Failure to receive a mark of S in this course is a disqualification for special honors.

Repeatable to a maximum of 15 cr. hrs.

A program of study arranged for each student, with individual conferences, reports, and Honors thesis.

**785 U G 3****Observational Techniques I**

A.

Prereq.: 300 or 611, and 651, Physics 657, and 705; or permission of instructor.

Astronomical spectroscopy, astrometry, photographic and photoelectric photometry.

**786 U G 3****Observational Techniques II**

W.

Prereq.: 785.

Continuation of 785.

**787 U G 3****Observational Techniques III**

Sp.

Prereq.: 786.

Continuation of 786.

**801 G 1****Astronomy Seminar I**

A.

Prereq.: 10 cr. hrs. each in 600-level courses or higher in Astron., Physics, and Math., or permission of instructor.

Repeatable to a maximum of 8 cr. hrs.

Seminars conducted on astronomical topics of current interest; students will participate actively in the presentation and discussion of materials.

**802 G 1****Astronomy Seminar II**

W.

Prereq.: 801.

Repeatable to a maximum of 8 cr. hrs.

Continuation of 801.

**803 G 1****Astronomy Seminar III**

Sp.

Prereq.: 802.

Repeatable to a maximum of 8 cr. hrs.

Continuation of 802.

**831 G 5****Single Stars I**

A.

Prereq.: 651, Physics 580.01 or 707, Math. 551, and 255 or 556; or permission of instructor.

Not open to students with credit for 821, 822, 823, 851, or 852.

Radio and optical observational and theoretical aspects of the atmospheres, interiors and evolution of single stars including the quiet and active sun.

**832 G 5****Single Stars II**

W.

Prereq.: 831 or permission of instructor.

Not open to students with credit for 821, 822, 823, 851, or 852.

Continuation of 831.

**833 G 5****Single Stars III**

Sp.

Prereq.: 832 or permission of instructor.

Not open to students with credit for 821, 822, 823, 851, or 852.

Continuation of 832.

**850 G 1-5****Current Topics in Astronomy**

A, W, Sp.

Prereq.: 10 cr. hrs. in 600-level courses or higher in each of Astron., Physics, and Math., or permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Staff members and visiting lecturers will present material on their current research problems.

**862 G 3****Radio Astronomy I**

W. 3 cl.

Prereq.: 651 and Physics 656 or Elec. E. 810 or permission of instructor.

Fundamental theory of radio astronomy and interpretation of basic radio observations; given in collaboration with the Department of Electrical Engineering.

**863 G 3****Radio Astronomy II**

Sp. 3 cl.

Prereq.: 862 or permission of instructor.

Advanced theory of generation, propagation and absorption of cosmic radio waves; given in collaboration with the Department of Electrical Engineering.

**871 G 5****Stellar Systems and Interstellar Matter I**

A.

Prereq.: 651, Physics 656 or Elec. E. 810, Statist. 521 or Physics 780.20, Math. 551, and 255 or 556; or permission of instructor.

Not open to students with credit for 841, 842, 843, 853, or 863.

Radio and optical observational and theoretical aspects of multiple star system dynamics, structure and statistics; interstellar gas and dust; external systems and cosmology.

**872 G 5**  
**Stellar Systems and Interstellar Matter II**  
 W.  
 Prereq.: 871 or permission of instructor.  
 Not open to students with credit for 841, 842, 843, 853, or 863.  
 Continuation of 871.

**873 G 5**  
**Stellar Systems and Interstellar Matter III**  
 Sp.  
 Prereq.: 872 or permission of instructor.  
 Not open to students with credit for 841, 842, 843, 853, or 863.  
 Continuation of 872.

**895 G 1-5**  
**Interdepartmental Seminar in Radio-Astronomy**  
 A, W, Sp.  
 (See under Interdepartmental Seminars.)

**999 G Arr.**  
**Research in Astronomy and Astrophysics**  
 Su, A, W, Sp.  
 Research for thesis or dissertation purposes only.

## Aviation

Office: Ohio State University Airport, 3160 Case Road

**Professor Eggspuehler** (Chairman); **Associate Professor Billings**; **Assistant Professors** Chapman, Easter, Gerke, Gilson, Hubbard, Taylor, and Weislogel.

**111 U 3**  
**Introduction to Aviation**  
 W, Sp. 3 cl.  
 A comprehensive study of the nation's air transportation system.

**201 U 1**  
**Primary Flight**  
 Su, A, W, Sp. 5 lab.  
 Prereq. or concur.: 211 and secure equipment usage charge and permission slip at University Airport prior to scheduling.  
 A laboratory course provided for students to achieve greater understanding of 211.

**211 U 4**  
**Elements of Aviation**  
 Su, A, W, Sp. 3 cl., 2 lab.  
 Prereq.: Math. 116 and Physics 111; or equiv.  
 Problems in fundamentals of flight and aircraft operation; objective studies of aviation laws and regulations.

**401 U 1-4**  
**Advanced Flight**  
 Su, A, W, Sp. 5 lab.  
 Prereq.: 201 and secure equipment usage charge and permission slip at University Airport prior to scheduling.  
 The student must register for specific studies in areas indicated below, and may register for more than one at a time.  
 Repeatable to a maximum of 16 cr. hrs.; subdivisions repeatable.

- 401.01 Precision Flight Maneuvers**
- 401.02 Flight Navigational Procedures**
- 401.03 Performance Evaluation**
- 401.04 Flight Safety**

**411 U 3**  
**Aircraft Performance**  
 A. 3 cl.  
 Prereq.: 211.  
 Studies of airframe components, performance and design characteristics, power plants, and federal certification of aircraft equipment.

**415 U 3**  
**Air Traffic Control and Flight Meteorology**  
 A, W, Sp. 3 cl.  
 Prereq.: 211.  
 Precision navigational techniques for position control, flight planning and cruise control, aids to navigation, fundamentals of meteorological analysis, and effects of weather on flight.

**419 U 3**  
**Analysis of Problems in Aviation Safety**  
 Sp. 3 cl.  
 Prereq.: 411 and 415.  
 Detailed analysis of standard and proposed procedures relating to safety, studies in pilot behavior, accident investigation, and safety programs.

**493 U 2-5**  
**Individual Studies in Aviation**  
 Su, A, W, Sp.  
 Prereq.: 3rd yr. standing and written permission of instructor.  
 Repeatable to a maximum of 10 cr. hrs.

**494 U 2-5**  
**Group Studies in Aviation**  
 Su, A, W, Sp.  
 Prereq.: 3rd yr. standing and written permission of instructor.  
 Repeatable to a maximum of 10 cr. hrs.

**593 U G 2-5**  
**Individual Studies in Aviation**  
 Su, A, W, Sp.  
 Prereq.: Written permission of dept.  
 Repeatable to a maximum of 10 cr. hrs.



## Biochemistry

Office: 780 Biological Sciences Building, 484 West 12th Avenue

**Professors** Serif (Chairman), Barber, Behrman, Bulen, Deatherage, Doskotch, Harper, Ives, Moore, Snell, and Van Winkle; **Associate Professors** Marzluf, Meleca, and Scott; **Assistant Professors** Aune, Gross, and Royer.

### 294 U 1-5

#### Group Studies

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs. for different subject matter only.

### 511 U G 4

#### Introduction to Biological Chemistry

Su, A, W, Sp. 3 cl.

Prereq.: Chem. 235 or 241, and 2 qtrs. of biological sciences; or permission of instructor.

An introductory course in biochemistry dealing with the molecular basis of structure and metabolism of plants, animals, and microorganisms.

### 512 U G 4

#### Biochemistry of Physiological Processes

Sp. 3 cl.

Prereq.: 511 or 514; a course in Physiology recommended.

The biochemical basis for physiological processes in higher animals; topics will include digestion and absorption, respiration, blood function, kidney function and endocrine control.

### 513 U G 4

#### Biochemistry and Molecular Biology

W. 3 cl.

Prereq.: Chem. 242 or 253; 2 qtrs. of biological sciences. Not open to students with credit for 511 without permission of instructor.

An introductory course in biochemistry and molecular biology dealing with the molecular basis of structure and function of life forms.

### 514 U G 4

#### Biochemistry and Molecular Biology

Sp. 3 cl.

Prereq.: 513.

Not open to students with credit for 511 without permission of instructor.

Continuation of 513.

### 521 U G 5

#### Introduction to Biological Chemistry: Laboratory

Su, A, W, Sp. 2 cl., 2 3-hr. labs.

Prereq. or concur.: 511, 513, or 514.

Laboratory work to accompany 511, 513, or 514; assay techniques for chemical constituents and metabolic reactions of living cells.

### 551 U G 5

#### Chemistry of Foods and Food Processing

W. 3 cl., 2 3-hr. labs.

Prereq.: Chem. 211 and 235 or equiv.

The chemical, physical, and biological nature of foods in relation to handling, processing, packaging, quality, and consumer acceptance.

### 611 U G 5

#### Molecular Genetics

Sp. 5 cl.

Prereq.: One course in Biochem. and background in one or more of the following areas: Genetics, Microbiol., Developmental Biol.; or permission of instructor.

Not open to students with credit for Genetics 611.

(Cross-listed in the Dept. of Genetics.)

Molecular mechanisms of DNA replication, mutation, recombination, and repair; analysis of gene structure; metabolic and genetic control mechanisms; procaryotic and eucaryotic systems are analyzed.

#### Biochemistry

(See Chem. 661.01 and 661.02.)

(Offered in cooperation with Chem., Biochem., and Phys. Chem.)

### 693 U 2-5 G 2-10

#### Individual Studies

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs. for undergraduate credit and to a maximum of 40 cr. hrs. for graduate credit.

### 694 U G 1-5

#### Group Studies

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

### 705 U G 5

#### General Biological Chemistry

A. 3 cl.

Prereq.: Chem. 242, 244 or 253, 254; Physical Chem. background of Kinetics and Thermodynamics or permission of instructor.

Not open to students with credit for Biochem. 611, 612, 613, or Physiol. Chem. 705.

(Cross-listed in the Dept. of Physiol. Chem.)

An intensive treatment of modern biochemistry; protein structure, enzyme catalyzed reactions, chemistry and metabolism and carbohydrates.

### 706 U G 5

#### General Biological Chemistry Laboratory

A. 2 4-hr. labs.

Prereq. or concur.: 705; 706, 708, and 710 should be taken in sequence.

Laboratory to accompany 705.

### 707 U G 5

#### General Biological Chemistry

W. 3 cl.

Prereq.: 705 or Physiol. Chem. 705.

Not open to students with credit for Physiol. Chem. 707.

(Cross-listed in the Dept. of Physiol. Chem.)

An intensive treatment of modern biochemistry; energy utilization and electron transport, photosynthesis, membranes and lipid metabolism.

### 708 U G 5

#### General Biological Chemistry Laboratory

W. 2 4-hr. labs.

Prereq.: 706.

Laboratory to accompany 707.

### 709 U G 5

#### General Biological Chemistry

Sp. 3 cl.

Prereq.: 707 or Physiol. Chem. 707.

Not open to students with credit for Physiol. Chem. 709. (Cross-listed in the Dept. of Physiol. Chem.)

An intensive treatment of modern biochemistry; intermediary metabolism of amino acids, proteins, and nucleic acids.

### 710 U G 5

#### General Biological Chemistry Laboratory

Sp. 2 4-hr. labs.

Prereq.: 708.

Laboratory to accompany 709.

### 721 U G 5

#### Physical Biochemistry

A, W. 5 cl.

Prereq.: Chem. 253 and 533, or permission of instructor.

##### 721.01\* Physical Biochemistry I

Introduction of equilibrium chemical thermodynamics for students of biochemistry, with emphasis on applications of the laws of thermodynamics to systems of biological interest.

##### 721.02\* Physical Biochemistry II

Study of the characterization of proteins including a discussion of optical and hydrodynamic properties and their relationship to protein structure.

##### 721.03†\* Physical Biochemistry III

Basic introduction to nonequilibrium thermodynamics and its applications to macromolecular diffusion, sedimentation in the ultracentrifuge, electrophoresis and viscosity.

##### 721.04†\* Physical Biochemistry IV

Enzyme kinetics, chemical catalysis, determination of groups at the active site, mechanism of specific enzymes and theories on enzyme efficiency and specificity.

### 731 U G 5

#### Molecular Photobiology

A. 3 cl.

Prereq.: 511 or 514, Chem. 253 and 521, Physics 113 and Math. 153.

##### 731.01\* Molecular Photobiology I

A comprehensive study of the photosynthetic process and photobiological origins of life.

##### 731.02\* Molecular Photobiology II

A molecular approach to contemporary photobiological reactions excluding photosynthesis.

### H783

U 3-5

#### Honors Course

Su, A, W, Sp. Arr.

Prereq.: 4th yr. standing with a grade of A in at least half of the courses in Biological Sciences and an average of B in the remainder; permission of instructor under whose supervision the work is to be completed and the Arts and Sciences Honors Committee. At least 2 qtrs. are required of candidates for the degrees Bachelor of Science or Bachelor of Arts with distinction in Biochemistry. Failure to receive a mark of S in this course is a disqualification for special honors.

Repeatable to a maximum of 15 cr. hrs.

A program of reading and research for each student with individual conferences, reports, and Honors thesis.

### 785

U 2-5 G 2-10

#### Research Principles and Techniques

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs. for undergrad. credit and to a maximum of 40 cr. hrs. for grad. credit.

### 811\*

G 3

#### Advanced Topics in Molecular Genetics

A. 1 2-hr. cl.

Prereq.: 611 or Genetics 611.

Not open to students with credit for Genetics 811.

(Cross-listed in the Dept. of Genetics.)

An examination of the current research in molecular genetics by selective reading assignments and critical analysis during class discussion periods.

### 821†\*

G 3

#### Enzymes

W. 3 cl.

Prereq.: 709 or equiv.

Advanced studies of enzymes and the mechanism of enzyme action.

### 831†\*

G 3

#### Carbohydrates

Sp. 3 cl.

Prereq.: 709, Chem. 635 recommended.

Advanced study of the metabolism of the carbohydrates.

### 850

G 2

#### Seminar in Biological Chemistry

A, W, Sp. 1 or 2 cl.

Repeatable to a maximum of 40 cr. hrs.

### 851†\*

G 2

#### Special Topics in Food Chemistry

W. 2 cl.

Prereq.: 551; Chem. 243, 531, 532; or equiv.

Advanced study of the chemistry of foods. Deatherage.

### 898

G 1

#### Interdepartmental Seminar in Nutrition and Food Technology

Sp. 1 cl.

(See under Interdepartmental Seminars.)

**999 G Arr.**  
**Research in Biochemistry**

Su, A, W, Sp.  
 Research for thesis or dissertation purposes only.

## Biology

Office: 112 Rightmire Hall, 1060 Carmack Road

(See courses in Biochemistry, Biophysics, Botany, Entomology, Genetics, Microbiology, and Zoology.)

**100 U 5**

**General Biology**

Su, A, W, Sp. 3 cl., 2 lab. hrs.  
 Not open to students with credit in Biol. 102.  
 An introduction to the biological sciences emphasizing the important concepts and principles which tend to unify the study of life at various levels of organization. Meleca.

**101 U 5**

**General Biology**

Su, A, W, Sp. 3 cl., 2 lab. hrs.  
 Prereq.: 100.  
 Further development of the biological concepts and principles introduced in 100, with emphasis on the ecosystem in reference to contemporary ecological problems. Williams.

**H299† U 1-5**

**Biological Sciences Honors Colloquium**

Su, A, W, Sp.  
 Prereq.: Participation in the Honors Program or permission of instructor.  
 Repeatable to a maximum of 10 cr. hrs.  
 Discussion of the rationale and instrumentation of specific fields of biological research; topics vary quarterly.

**General Cellular Biology**

(See Microbiology 640.)

**694† U 2-5 G 2-10**

**Group Studies**

Su, A, W, Sp.  
 Prereq.: Permission of instructor.  
 Repeatable to a maximum of 20 cr. hrs. for undergraduate credit and to a maximum of 35 cr. hrs. for graduate credit.  
 Some of the areas of faculty specialization available for group studies in Biology are shown in the Biological Sciences section of the Arts and Sciences Catalog.

**698† U G 1-15**

**Study Tours**

Sp. Classwork at OSU. Arr., travel and study abroad.  
 Prereq.: Permission of tour leader/instructor.  
 Repeatable for different-titled Study Tour only.  
 Study tours for the biological sciences.

**Environmental Pollution Abatement**

(See Civil E. 714.)

## Biophysics

Office: 980 Biological Sciences Building, 484 West 12th Avenue

**Professors** Lipetz (Chairman), Blackwell, Corson, Hill, Hollander, Rothstein, Smith, Snell, Stow, and Van Winkle; **Associate Professors** Biersdorf, Cassim, Gilbert, Hart, Ingling, Kornacker, and Ross.

**500 U 5**

**Introduction to Biophysics**

A, Sp. 5 cl.  
 Prereq.: Physics 111 and 112, Chem. 121 and 122, Biol. 100, and Math. 117; or equiv.  
 An introduction to the attitudes and principles which characterize the physico-chemical understanding of biological systems; examples of current biophysical research. Lipetz, Ross, Cassim, and Kornacker.

**610 U G 5**

**Introductory Photobiology**

Sp. 5 cl.  
 Prereq.: Chem. 123 or equiv., 1 course in organic chem., and permission of instructor.  
 The physico-chemical processes underlying various photobiological phenomena, with emphasis on those underlying vision.

**641†\* U G 5**

**Introduction to Molecular Biophysics**

A. 5 cl.  
 Prereq.: Math. 153 and Chem. 521 or Physics 251; or permission of instructor.  
 An introduction to applications of modern physics to problems in molecular biology; conceptual rather than mathematical aspects are stressed. Cassim.

**642 U G 5**

**Bioenergetics**

A. 5 cl.  
 Prereq.: Biol. 100, Chem. 123, Math. 122, Physics 112, or equivalents.  
 Elementary thermodynamics and its application to molecular processes in biology: ATP-ADP system, electron transport, photosynthesis, active transport, membrane potentials, muscle contraction. Ross.

**694 U 2-5 G 2-10**

**Group Studies**

Su, A, W, Sp.  
 Prereq.: Permission of instructor.  
 Repeatable to a maximum of 20 cr. hrs. for undergraduates and 35 cr. hrs. for graduates.  
 Group study of special topics in biophysics.

**695 U G 2**

**Seminar in Biophysics Research**

A, W, Sp. 2 cl.  
 Prereq.: Permission of chairman.  
 Repeatable to a maximum of 6 cr. hrs.  
 Survey of the areas of specialization and approaches to research in biophysics.

**700 U G 1****Seminar in Biophysics**

A, W, Sp. 1 cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 9 cr. hrs.

**702 U G 1-3****Advanced Experimental Methods in Biophysics**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 12 cr. hrs.

**705 U G 5****Psychophysical Measurement**

A. 4 cl., 1 2-hr. lab.

Prereq.: Psych. 100 or permission of instructor.

Analysis and evaluation of theories and methods of psychophysical measurement: general measurement theory; signal detection theory; scaling procedures. Smith.

**710 U G 5****Sensory Psychophysics**

W. 4 cl., 1 2-hr. lab.

Prereq.: 705 or permission of instructor.

Survey of psychophysical studies of sensory systems; variations in input energy and relationships between input and output under different operating conditions. Smith.

**714 U G 5****Biophysics of Cell Membranes**

A. 2 2-hr. cl.

Prereq.: 500 or permission of instructor.

Critical discussion of modern experimental and theoretical methods for studying active transport and electrical excitability. Kornacker.

**715 U G 5****Sensory Neurophysiology**

W. 2 2-hr. cl.

Prereq.: 714 or permission of instructor.

Introduction to the biophysical analysis of sensory transducers and pattern-recognizing neural networks. Kornacker.

**720†\* U G 5****Biocybernetics**

Sp. 5 cl.

Prereq.: Math. 255, Physics 133, and permission of instructor.

Physical models of organisms: mass, energy and information flow; non-linear oscillators; linear and non-linear control systems; adaptive systems; control system analysis for biologists. Lipetz.

**741\* U G 5****Molecular Biophysics I**

A. 4 cl.

Prereq.: Chem. 532 or equiv.

The chemical physics approach to the study of macromolecules as applied to important biological problems; for students in all biological disciplines. Cassim.

**742\* U G 5****Molecular Biophysics II**

W. 4 cl.

Prereq.: 741.

Continuation of 741. Cassim.

**743 U G 5****Nonequilibrium Thermodynamics**

Sp. 5 cl.

Prereq.: 642 or Chem. 521 or 532; Math. 254.

A coordinated theory of the thermodynamics of irreversible processes is presented; applications of the theory are made to biological transport processes. Ross.

**Radiation Biophysics**

(See Physiol. 746.)

**Physical Instrumentation for Biologists**

(See Physiol. 748.)

**750†\* U G 5****Molecular Basis of Motility**

W. 5 cl.

Prereq.: Chem. 123 or equiv., Physics 113 or equiv., Math. 153 or equiv.; and one course in Biol. or Biochem.; or permission of instructor.

Biological contractile systems—structure and function with emphasis on the molecular level. Cassim.

**760\* U G 5****Mechanisms of Psychobiological Integration**

W. 1 2-hr. cl., 6 lab. hrs.

Prereq.: Permission of instructor and 1 course in advanced vertebrate or mammalian physiology or physiological psychology; Pharmacol. 822, Physiol. 601-602 or 825-826 are recommended.

Survey of how psychologic factors modulate physiologic and behavioral parameters, and lead to adaptive and maladaptive responses to specific sensory stimuli and to the total environment. Corson.

**771 U G 3****Physical Analysis of Organized Systems in Biology**

Sp. 3 cl.

Prereq.: 500 or permission of instructor.

A unified approach to the analysis of structure-function relations in enzymes, membranes, and neural nets based on an extension of statistical thermodynamics. Kornacker.

**H783 U 3-5****Honors Course**

Su, A, W, Sp. Arr.

Prereq.: 4th yr. standing with a grade of A in at least half of the courses taken in the student's major program, with an average of B in the remainder; permission of instructor under whose supervision the work is to be completed and the Arts and Sciences Honors Committee.

Repeatable to a maximum of 15 cr. hrs.

At least 8 cr. hours are required of candidates for the degree Bachelor of Science or Bachelor of Arts **with distinction** in Biophysics. Failure to receive a mark of S in this course is disqualification for special honors.

A program of study arranged for each student, with individual conferences, reports and Honors thesis.

**793 U G 1-5****Individual Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 30 cr. hrs.

**797 U P G 1-5****Interdepartmental Seminars**

A, W, Sp.,

(See under Interdepartmental Seminars.)

- a. New Developments in Concepts and Techniques of Neuroscience.

**805 G 5****Sensory Biophysics I**

W. 4 cl., 1 2-hr. lab.

Prereq.: 705 and Physiol. Opt. 820, or permission of instructor.

Integration of psychophysical, electrophysiological, and anatomical data in the study of sensory systems; the visual system is used as a example. Ingling.

**806 G 5****Sensory Biophysics II**

Sp. 4 cl., 1 2-hr. lab.

Prereq.: 805.

Continuation of 805. Ingling.

**810\* G 5****Principles of Nervous System Integration**

A. 5 cl.

Prereq.: 715 and Math. 152.

The principles of organization of neurons into networks supplying the information handling and control functions needed for the integration and survival of the animal. Lipetz.

**811†\* G 3****Neural Integration of Multiple Sensory Inputs**

Sp. 1 3-hr. cl.

Prereq.: Mammalian Physiol.

Differential coding, gating, selective habituation and dishabituation by integrative centers of the nervous system which modulate auditory, tactile, visual, and kinesthetic stimuli. Hill.

**818 G 5****Functional Study of Sensory Abnormality**

A. 4 cl., 1 2-hr. lab.

Prereq.: 805 or permission of instructor.

Study of sensory abnormalities by electrophysiological and psychophysical methods to reveal anatomical and neural correlates of sensory function; examples drawn from the visual system. Blackwell and Biersdorf.

**841\* G 5****Quantum Biology**

Sp. 4 cl.

Prereq.: 742, or Chem. 943 or Chem. 973, or permission of instructor.

Quantum mechanics of excited states of conjugated systems of polypeptides and polynucleotides; dynamics of molecular processes involving energy and momentum storage and transfer. Cassim.

**Bioelectric Potentials**

(See Pharmacol. 845.)

**890 G 2****Interdepartmental Seminar in Developmental Biology**

A, W, Sp. 1 2-hr. cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 12 cr. hrs.

Students will present oral reports and lead discussion on research progress in specific areas of developmental biology.

**994 G 1-5****Group Studies**

A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

**999 G Arr.****Research in Biophysics**

Su, A, W, Sp.

Research for thesis and dissertation purposes only.

**Biostatistics**

Office: 128 Cockins Hall, 1958 Neil Avenue

**Professors** Harvey, Keller, Rustagi, and Whitney;  
**Associate Professor** Srivastava; **Assistant Professor** Allaire.

**601† U G 3****Stochastic Processes in the Biological Sciences**

A. 3 cl.

Prereq.: Statist. 520 and at least 10 cr. hrs. in Biol.

Introduction to discrete stochastic processes, random walk, Markov Chains, birth and death processes, epidemic process, processes for competing among species, diffusion processes, and applications.

**605 U G 3****Population Dynamics**

W. 3 cl.

Prereq.: Statist. 521.

Study of birth, death, and growth process, use of rates and ratios, force of mortality, competing risks, and selected epidemiological problems.

**607 U G 1-5****Biostatistics Laboratory**

Su, Sp.

Prereq.: Grad. standing in Statist. or Biostat., or permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

Experience in statistical design and analysis of biomedical studies through individual association with active research workers in medicine.

610 U G 3

**Statistical Bioassay I**

Sp. 3 cl.

Prereq.: Statist. 528 or 521, and Pharmacol. 600; or permission of instructor.

Direct assays, dose-response relationships, parallel line and slope ratio assay, special statistical designs in assay, Bayesian bioassay; examples.

611† U G 3

**Statistical Bioassay II**

Su. 3 cl.

Prereq.: 610.

Continuation of 610.

616† U G 5

**Computer Applications in the Biomedical Sciences**

Su.

Prereq.: Permission of instructor.

Introduction to computer programming languages such as Fortran, Algo, Cobol; packaged statistical programs; medical applications of computers: differential diagnosis, radiation treatment dose planning, electrocardiogram analysis.

800 G 2-5

**Advanced Topics in Biostatistics I**

A.

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Topics from current research in biostatistics.

801 G 2-5

**Advanced Topics in Biostatistics II**

W.

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Continuation of 800.

802 G 2-5

**Advanced Topics in Biostatistics III**

Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Continuation of 801.

999 G Arr.

**Research in Biostatistics**

A, W, Sp.

Research for dissertation purposes only.

## Black Studies

Office: 232 Dieter Cunz Hall, 1841 Millikin Road

**Associate Professor Nelson** (Chairman); **Professor Dathorne** **Associate Professors** McCray, Stull, and Thornton; **Assistant Professors** Barber, Davis, Ekanem, Elango, Hansen, Nesbitt, Njoroge, Van Horne, and Williams; **Instructors** Esipiku and Moreland; **Visiting Instructor** Colston; **Lecturer** James.

101 U 5

**Introduction to Black Studies**

Su, A, W, Sp. 3 cl., 2 1-hr. labs.

An introduction to the goals, purposes, and basic preparation necessary for other black studies courses.

130 U 5

**Africa and The World**

130.01 African History

A, W. 5 cl.

Not open to students with credit for Hist. 130.01.

(Cross-listed in the Dept. of Hist.)

A general introduction to the history of Africa from prehistoric to recent times.

201 U 5

**Elementary Swahili**

Su, A, W, Sp. 5 cl.

Pronunciation relationships between vowels and consonants, practice of conversation in relation to names of things, greetings, songs, etc.

202 U 5

**Elementary Swahili**

Su, A, W, Sp. 5 cl.

Prereq.: 201 or permission of instructor.

Continuation of elementary Swahili with an emphasis on grammar.

**Social Trends and Problems**

(See Sociology 202.)

(Offered in cooperation with the Black Studies Division.)

203 U 5

**Intermediate Swahili**

A, W, Sp. 5 cl.

Prereq.: 202 or permission of instructor.

Continuation of Swahili with emphasis on reading and writing; translation of simple sentences or words from Swahili to English, English to Swahili.

204 U 5

**Intermediate Swahili**

A, W, Sp. 5 cl.

Prereq.: 203 or permission of instructor.

Intermediate grammar, sentence analysis with reference to parts of speech.

220 U 5

**An Introduction to African Education Planning and Administration: A Comparative Analysis**

W, Sp. 5 cl.

Policy making and control in African education.

230 U 3

**The Black Woman: Her Role in the Liberation Struggle**

Sp. 3 cl.

The political role of the black woman in the struggle for black freedom; examination of changing laws and customs affecting the status of black women.

244 U 3

**Survey of African and African-Derived Music in the Western World**

Sp. 3 cl.

Not open to students with credit for Music 244.  
(Cross-listed in the School of Music.)

An introduction to traditional African music and its role in the history and development of Afro-American music with its concomitant socio-political milieu.

247 U 5

**Africa in the 19th Century**

W. 5 cl.

Not open to students with credit for History 247.  
(Cross-listed in the Dept. of Hist.)

Emphasis on African societies during the century of the European scramble for colonies.

248 U 5

**Leadership and Mass Movements in Contemporary Africa**

Su, W. 5 cl.

Not open to students with credit for History 248.  
(Cross-listed in the Dept. of Hist.)

A survey of modern African leaders, their philosophies and methods, and a study of the historical, geographical, economical, and political factors that gave rise to the drive for national independence after 1945.

251 U 5

**Introduction to African Literature**

A. 5 cl.

An assessment of the oral prose tradition and written prose of African literature; specific emphasis placed on student reading from primary sources.

**American Minority Relations**

(See Sociology 280.)

(Offered in cooperation with the Black Studies Division.)

**Introduction to Afro-American Literature**

(See English 281.)

(Offered in cooperation with the Black Studies Division.)

294 U 1-5

**Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Groups of students are given an opportunity to pursue special studies not otherwise offered.

325 U 5

**Freedom Versus Equality: Blacks and the Political Order**

W. 5 cl.

A systematic analysis of the impact of the simultaneous quest for equality and freedom by blacks and other minorities upon the social and political order.

326 U 5

**Black Americans and the Legal System**

Sp. 5 cl.

An examination of the role of the legal system in the social and political dynamics of blacks in American society.

327 U 5

**Introduction to African Politics**

A, W. 5 cl.

Examination of dynamics of nation-building in African countries in transition from colonial dependencies to modern nation-states.

338 U 5

**African Territories as Nation-States: Selected Case Studies**

W. 5 cl.

Case studies of selected African territories gaining independence in the aftermath of the second World War.

351 U 5

**Caribbean Literature in English**

Sp. 5 cl.

A consideration of prose, poetry, and drama written by Caribbean authors focusing on Caribbean literature in English within the framework of black literature.

352 U 5

**The Afro-American Cultural and Intellectual Tradition**

Sp. 5 cl.

Salient themes in the experience of the black man in America including slavery and bondage, emancipation, integration, and revolt.

401 U 5

**Advanced Swahili Grammar**

Sp. 5 cl.

Prereq.: 204 or permission of instructor.

Review of fundamental principles of grammar and syntax; exercises in Swahili.

402 U 3

**Advanced Swahili, Grammar and Composition**

W. 5 cl.

Prereq.: 401 or permission of instructor.

Introduction to advanced Swahili composition and grammar.

**Ethnology of Africa**

(See Anthropology 415.)

(Offered in cooperation with the Black Studies Division.)

450 U 5

**The History of Malawi**

A. 5 cl.

A detailed study of human events in Malawi from early times to the colonial period focussing on iron-age state systems.

451 U 5

**The Black Experience in Caribbean, African, and Afro-American Literatures**

W. 5 cl.

Prereq.: Junior or senior standing.

Exploration of themes, attitudes, and parallels in black literatures of Africa, the United States, and the Caribbean; particularly stressed will be negritude and Pan-Africanism.

**Comparative Race Relations**

(See Sociology 480.)

(Offered in cooperation with the Black Studies Division.)

**Economics of the Ghetto**

(See Economics 490.)

(Offered in cooperation with the Black Studies Division.)

500 U 5

**Contemporary African Thinkers**

W. 5 cl.

Prereq.: 101 or permission of instructor.

A study of the writings and achievements of contemporary African thinkers.

504 U 5

**Black Politics**

A. 5 cl.

Not open to students with credit for Pol. Sc. 208 or 504.

(Cross-listed in the Dept. of Pol. Sc.)

Economic, political, and social constraints on the development of black political power; the efforts made by black people in recent times to organize for effective political action.

**Social Relations in Folk Societies**

(See Anthropology 505.)

(Offered in cooperation with the Black Studies Division.)

510 U 5

**Kwame Nkrumah**

Sp. 5 cl.

Prereq.: 101 or permission of instructor.

A study of the life, writings, and work of Kwame Nkrumah.

520 U G 5

**Divergence in Educational Development; The Case of Kenya, Uganda, and Tanzania**

A, Sp. 5 cl.

A comparison of educational policies in three East African nations before and after independence.

525 U G 5

**European Colonial Politics in Africa**

W. 5 cl.

An examination of the social, economic, and political impact of policies pursued by major European colonial powers toward Africa and African people.

527 U G 5

**Pan-Africanism and Nationalism**

A. 5 cl.

Pan-Africanism and nationalism in the development of Africa.

530 U G 5

**African Political Systems: A Comparative Analysis**

Sp. 5 cl.

A comparative examination of problems of nation-building and national integration faced by selected African nations in the postcolonial period.

533 U G 5

**Order and Disorder: Blacks in Quest of Social Justice**

W. 5 cl.

Comparison of significant black and white thinkers on the concept of order in social and political life.

536 U G 5

**The History of Rhodesia**

W. 5 cl.

Prereq.: Permission of instructor.

An examination of Zimbabwe (Rhodesia) focussing on Ndebele and Shona reactions to British incursions.

537 U G 5

**History of Southern Africa**

Sp. 5 cl.

Not open to students with credit for History 537.

(Cross-listed in the Department of History.)

A study of the processes and patterns of social change from early times to the present.

538 U G 5

**West African History**

W. 5 cl.

Not open to students with credit for History 538.

(Cross-listed in the Department of History.)

An examination of the processes of state formation, trade, and civilization in Africa's Sudanese and Guinean regions.

545 U 5

**Early Afro-American Thinkers**

Su, W. 5 cl.

Prereq.: 101 or permission of instructor.

A study of the writings and achievements of early Afro-American thinkers.

546 U G 5

**Human Migration in Southern Africa**

W. 5 cl.

Prereq.: Permission of instructor.

A survey of the complex patterns of human movements in southern Africa from prehistoric to modern times, with emphasis on environmental incentives and constraints.

551 U G 5

**Selected Topics in Afro-American and Related Literature**

Sp. 5 cl.

Prereq.: 251 or 351.

Topics selected will relate to specific interests of enrolled students, who will develop an intensive analysis of the topic of their choice.



552 U G 5

**Contemporary Afro-American Culture**

W. 5 cl.

Afro-American culture in 20th century America.

580 U 5

**Contemporary Afro-American Leaders**

Su, A. 5 cl.

The evolution of black leadership after World War II, from non-violence to black nationalism.

581 U 5

**Philosophy in Contemporary African Literature**

Sp. 5 cl.

Discussion of African social and political thought as presented by selected African novelists.

594 U 3-5

**Group Studies**

Su, A, W, Sp.

Prereq.: 101 or permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

The investigation of particular problems in various areas of black studies.

636 U G 5

**Seminar on Central African History**

Sp. 5 cl.

Prereq.: Permission of instructor.

Specific themes in central African history.

**Racial and Ethnic Differentiation**

(See Sociology 780.)

(Offered in cooperation with the Black Studies Division.)

## Botany

Office: 108 Botany and Zoology Building, 1735 Neil Avenue

**Professors** Schmitt (Chairman), Bendixen, Bohning, Ellett, Janson, Paddock, Partyka, Popham, Rudolph, Schopf, Swanson, and Taft; **Associate Professors** Bradfute, Garraway, Giesy, Gilbert, Johnson, and Stuckey; **Assistant Professors** Bart, Cline, Evans, Fratianne, Halfen, Hostetter, Larsen, Platt, Racine, Raghavan, Seymour, Snyder, Stuessy, and Yoder; **Instructor** Slater.

102 U 5

**General Botany**

Su, A, W, Sp.

Prereq.: Biol. 100.

Not open to students with credit for 100 or 500.

An observation and discussion course with emphasis on the structure, processes, and reproduction of the seed plants.

105 U 5

**Fundamental Concepts in General Botany**

Su, A, W, Sp. 3 cl., 2 2-hr. labs.

Prereq.: Biol. 100.

Not open to students with credit for 102 or 500.

An introduction to the broad concepts in Botany.

202 U 5

**Plant Development**

W. 3 cl., 2 2-hr. labs.

Prereq.: 102.

Not open to students with credit for Biol. 202.

An introductory course in plant development at the organismic level, emphasizing physiology, morphology, and anatomy. Raghavan.

H206 U 3

**Rationale of Experimental Botany**

Sp. 2 1½-hr. cl.

Prereq.: 10 cr. hrs. in biol. sciences and permission of instructor.

An analysis of the rationale and epistemological bases of several paradigm programs of botanical research. Platt.

210 U 5

**Local Flora**

Su, Sp. 4 2-hr cl.; several Sat. field trips.

Prereq.: 101 or 102 or 500 or permission of instructor.

Not open to students with credit for 410.

A laboratory, field and discussion course in identifying common Ohio plants; emphasis on taxonomic principles, use of keys and manuals, and field recognition of plants. Stuckey and Stuessy.

260 U 5

**Fungi and Man**

A. 5 cl.

Prereq.: 102 or permission of instructor.

The interrelationships of fungi and man, as exemplified by those activities beneficial or detrimental to mankind. Schmitt.

294 U 1-5

**Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 10 cr. hrs. for different topics only.

Group study of topics in Botany.

**General Plant Pathology**

(See Plant Pathology 401.)

430 U 3 or 5

**Introductory Plant Physiology**

Su, A, Sp. 3 cl., or 3 cl., 2 2-hr. labs.

Prereq.: 101 or 102 or 500; 10 cr. hrs. in Chem., or permission of instructor.

Laboratory optional.

Topics in plant physiology at introductory level; solutions, diffusion, osmosis, transpiration, absorption and translocation of water, metabolism, enzymes, respiration, carbohydrate and lipid metabolism. Cline, Evans, and Fratianne.

**431 U 3 or 5**  
**Introductory Plant Physiology**

W. 3 cl., or 3 cl., 2 2-hr. labs.

Prereq.: 101 or 102 or 500; 10 cr. hrs. in Chem., or permission of instructor.

Laboratory optional.

Topics in plant physiology at introductory level; pigments, photosynthesis, protein metabolism, absorption and utilization of mineral salts, solute translocation, hormones, plant growth and development. Cline, Evans, and Fratiannie.

**440 U 5**  
**The Plant Kingdom**

A. 3 cl., 2 2-hr. labs.

Prereq.: 102 or 500 or permission of instructor.

Evolutionary sequences in living representatives of the great plant groups; emphasis on forms especially significant to man. Johnson.

**500 U G 5**  
**Basic Concepts in Botany**

A, W.

Prereq.: 10 cr. hrs. Chem.

Not open to students with credit for 100 or 102.

A course in the basic concepts of botany for advanced students with a fundamental knowledge of chemistry. Taft.

**General Genetics**  
 (See Genetics 500.)

**601 U G 5**  
**History of Biology**

Sp. 5 cl.

Prereq.: 15 cr. hrs. in Biological Sciences at the 400 level or above, or permission of instructor.

Not open to students with credit for Biology 610.

Origin and development of important biological approaches, concepts, and theories including those of the contemporary period. Rudolph.

**610 U G 4**  
**Field Botany**

Su (1st term).

Prereq.: 101 or 102 or 500, and 15 additional cr. hrs. in Biological Sciences or permission of instructor.

Given only at Franz Theodore Stone Laboratory.

Collection, preservation, field and laboratory identification, and local distribution of plants of the major groups.

**611 U G 4 or 5**  
**Higher Aquatic Plants**

Su, A.

a. Su. (4 cr. hrs.) Given only at Franz Theodore Stone Laboratory. 3 all-day cl.

b. A. (5 cr. hrs.) Given only on Columbus campus. 2 cl., 1 4-hr. lab., several Sat. field trips.

Prereq.: 101 or 102 or 500, and 15 additional cr. hrs. in Biological Sciences.

Aquatic plants, other than the algae of Great Lakes region; field and laboratory work on their identification, and ecological and geographical relations. Stuckey.

**612\* U G 5**  
**Taxonomy of Vascular Plants**

A. 3 cl., 2 2-hr. lab. Several Sat. field trips.

Prereq.: 210 or 610, and 10 additional cr. hrs. in biological sciences or permission of instructor.

A laboratory, field, and discussion course concerning the classification of vascular plants; emphasis on taxonomic principles, systems of classification, family characteristics and relationships. Stuckey and Stuessy.

**620 U G 5**  
**Basic Principles of Plant Ecology**

A, Sp. 3 cl., 1 3-hr lab., several Sat. field trips, 1 3-day field trip.

Prereq.: 101 or 102 or 500, and 15 additional cr. hrs. in Biological Sciences.

The establishment, development, succession, and dynamics of plant communities and their interrelations with historic, climatic, soil, and biotic factors. Gilbert and Racine.

**621 U G 4**  
**Field Plant Ecology**

Su (2nd term).

Prereq.: 101 or 102 or 500, and 15 additional cr. hrs. in Biological Sciences.

Given only at Franz Theodore Stone Laboratory.

Principles of plant ecology as exemplified by the study of aquatic and terrestrial habitats; emphasis on field work with supplementary lectures and laboratory work.

**630 U G 3**  
**Plant Physiology**

A, Sp. 3 cl.

Prereq.: 101 or 102 or 500, plus Chem. 242 or 252 or Biochem. 511; or permission of instructor.

An advanced course in plant physiology; solutions, diffusion, osmotic quantities, transpiration, absorption and translocation of water, protein metabolism, enzymes, and respiration. Cline, Evans, Fratiannie, Platt, and Swanson.

**631 U G 3**  
**Plant Physiology**

Su, W. 3 cl.

Prereq.: 101 or 102 or 500, plus Chem. 242 or 252 or Biochem. 511; or permission of instructor.

An advanced course in plant physiology; pigments, photosynthesis, carbohydrate and fat metabolism, absorption of mineral salts, translocation of solutes, regulation of plant growth and development. Cline, Evans, Fratiannie, Platt, and Swanson.

**The Cytological Basis of Genetics**  
 (See Genetics 631.)

**632 U G 4**  
**Physiology of Aquatic Plants**

Su (2nd term).

Prereq.: 101 or 102 or 500 or equiv. and 20 cr. hrs. in Chem.

Given only at Franz Theodore Stone Laboratory.

Lectures, discussions, laboratory and field work on basic topics in the physiology of aquatic plants.

**Plant Genetics**  
 (See Genetics 632.)

**633 U G 3****Plant Physiology Laboratory**

A, Sp. 2 3-hr. labs.

Prereq. or concur.: 630 or permission of instructor.

An experimental approach to the topics listed under 630. Cline, Evans, Fratianna, Platt, and Swanson.

**634 U G 3****Plant Physiology Laboratory**

Su, W. 2 3-hr. labs.

Prereq. or concur.: 631 or permission of instructor.

An experimental approach to the topics listed under 631. Cline, Evans, Fratianna, Platt, and Swanson.

**640 U G 5****Morphology of the Bryophytes and Pteridophytes**

Sp. 4 2-hr. labs.

Prereq.: 210 or 440 or permission of instructor.

An advanced course in plant morphology; emphasis on variation in the reproductive process, vegetative structure, evolution, and economic importance of liverworts, mosses, and ferns. Giesy.

**641 U G 5****Morphology of the Seed Plants**

A. 4 2-hr. cl.

Prereq.: 101 or 102 or 500, and 15 additional cr. hrs. in Biological Sciences.

Reproductive mechanisms and processes in angiosperms and gymnosperms. Raghavan.

**642 U G 5****Plant Microtechnic**

W. 4 2-hr. lec./labs.

Prereq.: 102 or 500 or Biol. 100, or permission of instructor.

Principles and methods of preparing permanent plant tissue microscopic preparations; student has opportunity to prepare a personal slide collection suitable for teaching or research. Johnson.

**643 U G 5****Developmental Plant Anatomy**

Su, W, Sp. 4 2-hr. cl.

Prereq.: 10 cr. hrs. in Biological Sciences or permission of instructor.

An observation-discussion course concerning three-dimensional, chronological, and causal dynamics of origin, differentiation, and development of tissues and organs of vascular plants. Popham.

**644 U G 4 or 5****Algae**

Sp. 4 2-hr. cl.

Prereq.: 101 or 102 or 500, and 15 additional cr. hrs. in Biological Sciences or permission of instructor.

In Summer Qtr. given only at Franz Theodore Stone Laboratory.

A general course covering identification, growth, reproduction, evolution, distribution and economic importance of the algae. Taft.

**645 U G 5****Experimental Phycology**

A. 4 2-hr. cl.

Prereq.: 644 or permission of instructor.

Isolation, purification, growth, and identification of algae in culture; experimental methods of studying structure, ecology, physiology, and life histories of selected species. Hostetter.

**646 U G 5****Diatom Ecology and Systematics**

W. 4 2-hr. cl.

Prereq.: Permission of instructor.

Ecology and systematics of freshwater diatoms including some special techniques, e.g., critical microscopy, photomicrography, and community analysis are covered; collection is required.

**660 U G 5****Mycology**

A. 3 cl., 2 2-hr. lab.

Prereq.: 101 or 102 or 500, and 15 additional cr. hrs. in Biological Sciences.

A study of structures, life histories, and classification of the fungi. Rudolph, Schmitt, and Seymour.

**662****Medical Mycology**

The fungi pathogenic to man, their structure and distribution, and the importance of human mycotic diseases. Schmitt.

**662.01 Lecture and Laboratory U G 5**

W. 3 cl., 2 2-hr. lab.

Prereq.: Microbiol. 509 or 607 or Med. Microb. 625, and 10 cr. hrs. in Biological Sciences.

**663 U G 4 or 5****Aquatic Mycology**

Su, Sp.

a. Su. (4 cr. hrs.) Given only at Franz Theodore Stone Laboratory during odd numbered years. 3 all-day cl.

b. Sp. (5 cr. hrs.) Given only on Columbus campus during even numbered yrs. 3 cl., 2 2-hr. lab.

Prereq.: 101 or 102 or 500, and 15 additional cr. hrs. in Biological Sciences.

A lecture, laboratory, and field course designed to acquaint the student with the fungi found in aquatic habitats including soil water. Seymour.

**Cytologic Preparations in Electron Microscopy**

(See Microbiology 670.)

**693 U G 1-5****Individual Studies**

Su, A, W, Sp.

Prereq.: 101 or 102 or 500, and 15 additional cr. hrs. in Biological Sciences.

No more than 5 cr. hrs. may be counted toward an undergraduate major in Botany.

Repeatable to a maximum of 15 cr. hrs. for undergraduates.

Problems may be selected in the fields of taxonomy, morphology, anatomy, phycology, physiology, ecology, genetics, cytology, mycology, or lichenology.

**694 U G 1-5****Group Studies**

A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

Group study of special topics in botany.

**709 U G 1****Botanical Colloquium**

A, W, Sp.

Repeatable to a maximum of 15 cr. hrs.

A series of lectures, given by off-campus authorities, on currently important subjects.

**740\* U G 5****Plant Morphogenesis**

Sp. 3 cl., 2 2-hr. labs.

Prereq.: 430 and 431 or 630 and 631; 643; or permission of instructor.

Factors of growth, organization, and differentiation in plants with emphasis on modern experimental approaches to the understanding of the integrated control of plant growth. Raghavan.

**H783 U 3-5****Honors Course**

Su, A, W, Sp.

Prereq.: 4th year standing, a grade of A in at least half of the Botany courses and an average of B in the remainder; permission of instructor under whose supervision the work is to be completed and the Arts and Sciences Honors Committee.

Failure to receive a mark of S in this course is a disqualification for graduation with distinction.

Repeatable to a maximum of 15 cr. hrs.

Problems may be selected in the fields of taxonomy, morphology, morphogenesis, anatomy, phycology, physiology, ecology, mycology, or lichenology.

**810\* G 5****Experimental Taxonomy**

A. 3 cl., 2 2-hr. lab., several Sat. field trips.

Prereq.: 210 or 610, and Genetics 500 or permission of instructor.

Biosystematic categories, population analysis of mass collections, individual variations, hybridization, and introgression are studied in relation to the methods and materials of experimental taxonomic research. Stuessy.

**819 G 2****Seminar in Plant Taxonomy**

A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 30 cr. hrs.

Stuckey and Stuessy.

**829 G 2****Seminar in Plant Ecology**

A, W, Sp.

Prereq.: 620 and permission of instructor.

Repeatable to a maximum of 12 cr. hrs.

Gilbert and Racine.

**832†\* G 3****Advanced Plant Physiology: Metabolism**

A. 3 cl.

Prereq.: 631, Biochem. 521, or Chem. 532.

Advanced study of selected topics, mainly respiration, metabolic syntheses, absorption, and utilization of mineral salts, metabolism of growth substances, photosynthesis, and translocation. Platt.

**833 G 3****Advanced Plant Physiology: Growth**

W. 3 cl.

Prereq.: 630, 631, and 10 additional cr. hrs. in biol. sciences; or permission of instructor.

The physiology of growth and reproduction; special attention given to the interrelated effects of internal and external factors on these processes. Cline, Evans, and Frattianne.

**834 G 3****Advanced Plant Physiology: Water and Solute Relations**

Sp. 3 cl.

Prereq.: 630, 631, and 10 additional cr. hrs. in biol. sciences; or permission of instructor.

Osmotic relations, mechanisms of water and solute uptake and transport; salt metabolism, drought and salt tolerance. Swanson.

**839 G 1****Seminar in Plant Physiology**

A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Cline, Evans, Frattianne, Platt, and Swanson.

**848 G 1****Seminar in Plant Anatomy and Morphology**

A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

Discussions of theoretical and most current concepts in anatomy and morphology. Johnson, Popham, and Raghavan.

**860†\* G 3****Advanced Mycology**

Sp. 3 2-hr. lab.

Prereq.: 660.

Advanced detailed study of specific groups of fungi, with emphasis on their morphology, cytology, and genetics. Rudolph, Schmitt, and Seymour.

**861\* G 5****Physiology of Fungi**

W. 3 cl., 2 2-hr. lab.

Prereq.: 630, 631, 660, or permission of instructor.

The physiology of the nutrition, growth, and reproduction of fungi. Garraway and Larsen.

**869 G 2****Seminar in Cryptogamic Botany**

A, W, Sp. 1 2-hr. cl. arr.

Prereq.: Permission of instructor.

Repeatable to a maximum of 30 cr. hrs.

Hostetter, Rudolph, Schmitt, Seymour, and Taft.

**890 G 2****Interdepartmental Seminar in Developmental Biology**

A, W, Sp. 1 2-hr. cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 12 cr. hrs.

Students will present oral reports and lead discussion on research progress in specific areas of developmental biology.

**891 G 2**  
**Interdepartmental Seminar**  
**in Environmental Biology**

Su, A, W, Sp. 1 2-hr. cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 24 cr. hrs.

Selected topics treating the environmental aspects of organisms, populations, and ecosystems as they may relate to time, space, and human activities.

**896 G 1-3**  
**Interdepartmental Seminar**  
**in Polar and Alpine Studies**

Sp.

(See under Interdepartmental Seminars.)

**897 G 1**  
**Interdepartmental Seminar in Natural Resources**

A, W, Sp.

(See under Interdepartmental Seminars.)

**898 G 1**  
**Interdepartmental Seminar**  
**in Nutrition and Food Technology**

Sp.

(See under Interdepartmental Seminars.)

**999 G Arr.**  
**Research in Botany**

Su, A, W, Sp.

Research for thesis and dissertation purposes only.

## Business Administration

Offices of Academic Faculties: 1775 College Road

Accounting: 452 Hagerty Hall; Chairman—Paul E. Fertig

Finance (including Business Law, Insurance and Risk, and Real Estate): 308D Hagerty Hall; Chairman—David W. Cole.

Management Sciences (including Adaptive Systems, Manpower and Industrial Relations, Organizational Behavior, Production and Operations Management, and Quantitative and Research Methods): 414 Hagerty Hall; Chairman—Robert C. Miljus.

Marketing (including Business Policy and Special Studies, International Business, and Transportation and Logistics): 314 Hagerty Hall; Chairman—W. Arthur Cullman.

**Professors** Bartels, Beckman (Emeritus), Behling, Bickelhaupt, Blythe, Burns, Cole, Craig (Emeritus), Cullman, J. Davis, R. Davis (Emeritus), Donaldson (Emeritus), Fertig, Foster, A. Gordon (Emeritus), Greenball, Gibson, Heckert (Emeritus), Hicks, Hoagland (Emeritus), Howland, Jucius (Emeritus), Kane (Everett D. Reese Professor), Kindig, Kollaritsch, LaLonde (J. R. Riley Professor), Livingstone, McCollough, McCoy, Miljus, Powell, Rapp, Stanley, Stern, Stogdill, Stone, and Sturdivant (Mishula Riklis Professor); **Associate Professors** Baumler, Blackwell, Bobbitt, Brush, Burnham, Close, Cordell (Emeritus), Dunfee, Grabner, Hardy, Harvey, Howell, Johnson, Kinard, Krajewski,

McNaul, Mullins, Northrup, Racster, Ritzman, Robeson, Talarzyk, Vitt, and Yaney; **Assistant Professors** Bartos, Bolon (Emeritus), Campagna, Deutscher, Edwards, Georges, Ginter, Goodman, K. Gordon, Kerr, Krasniewski, Krouse, Li, Murphy, Pack, Ricks, Scott, and Squaire.

Groups of courses in Business Administration are:  
 Accounting, see page 18.

Adaptive Systems 802.01, 802.02, 802.03

Business Law 510, 611, 612, 613, 810, 811

Business Policy and Special Studies 493, 494, 496, 693, 694, 799, 809, 899, 998, 999

Finance 220, 620, 720, 721, 722, 723, 724, 725, 726, 727, 729, 820, 821, 822, 823, 826, 920, 929

Insurance and Risk 640, 741, 743, 749, 840, 841, 843

International Business 757, 856, 857

Management Processes 700, 701

Manpower and Industrial Relations 660, 761, 762, 769, 860, 861, 862, 960, 961

Marketing 650, 750, 751, 752, 753, 754, 755, 756, 758, 850, 852, 854, 950, 951, 955, 959

Organizational Behavior 500, 703, 708, 803, 804, 805, 911, 912, 913, 914, 915, 917, 918, 919

Production and Operations Management 630, 730, 731, 732, 734, 739, 830, 832, 834, 835, 930, 931

Quantitative and Research Methods in Business 490, 601, 801.01, 801.02, 801.03, 807

Real Estate 670, 771, 772, 773, 870, 871, 873

Transportation and Logistics 780, 781, 880, 889

**220 U 3**  
**Personal Finance**

A, W, Sp. 3 cl.

Prereq.: 2nd yr. standing.

Not open to students in College of Administrative Science majoring in either Acc. or Finance.

Budgeting, credit, borrowing money, bank relationships, savings, insurance, real estate, stocks and bonds, income taxes, social security, annuities, wills trusts, estates, and taxes. Donaldson and Staff.

**490 U 3**  
**Industrial Statistics**

Su, A, W, Sp. 3 cl.

Prereq.: Econ. 442 or equiv.

The application of statistical methods to the design and analysis of experiments, with a view to planning, organizing, and controlling the output of industry. Gordon and Pack.

**493 U 1-10**  
**Individual Studies**

Su, A, W, Sp.

Prereq.: Written permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Individual study projects in selected areas in business administration.

**494 U 1-10**  
**Group Studies**

Su, A, W, Sp.

Prereq.: Written permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Group study projects in selected areas in business administration.

**496 U 3**  
**Black Business Studies**

W. 1 2-hr. cl., 1 hr. arr.

Prereq.: Permission of instructor.

Repeatable to a maximum of 9 cr. hrs.

Methods of securing improved buying and employment opportunities for black people in small and large marketing institutions; guest speakers from the black community. Blackwell.

**500 U G 3**  
**Principles of Management**

Su, A, W, Sp. 3 cl.

Prereq.: Econ. 200, 201, 400, 402, or equiv.

An intensive examination of the basic fundamentals of organization and management underlying the solution of management problems.

**510 U 4**  
**Legal Environment of Business**

Su, A, W, Sp. 4 cl.

Prereq.: 3rd yr. standing.

American legal institutions and sources of law; analysis of basic contractual concepts; and an introduction to government regulation. Howell, Gibson, and Dunfee.

**601 U G 2-5**  
**Business Statistics**

Su, A, W, Sp. 5 cl.

Prereq.: Econ. 442 or equiv. or Soc. Work 380 or equiv.

Price and production indexes; analysis of time series; linear correlation applied to economic and business problems. Bartos and Pack.

**611 U G 3**  
**Regulatory Environment of the Business Firm**

W. 3 cl.

Prereq.: 3rd year standing.

Analysis of the legal basis of government regulation, and a survey of the principal federal regulatory and antitrust statutes with emphasis on current application.

**612 U G 3**  
**Legal Aspects of the Distributive Processes**

W, Sp. 3 cl.

Prereq.: 510 or equiv.

Problems arising out of the distribution of consumer goods; obligations of sellers, including product liability; analysis of selected pricing, consumer-protection, and commercial paper statutes. Howell and Squire.

**613 U G 3**  
**Legal Environment of Institutional Management**

A, W, Sp. 3 cl.

Prereq.: 510 or equiv.

Examination of business associations, emphasizing the legal aspects of the management process and the societal influence and responsibilities of the corporation. Dunfee and Gibson.

**620 U G 4**  
**Corporate Finance**

Su, A, W, Sp. 2 2-hr. cl.

H620 (honors) may be available to students enrolled in a college Honors Program or by permission of faculty.

Prereq.: Econ. 200, 201, 400, 402, or equiv.; and Acc. 201, 212, or equiv.

Forms of business organization; corporate securities, financing through securities; sources and management of working capital; administration of income; expansion and combination; reorganization, receivership, and dissolution. Cole, Foster, and Staff.

**630 U G 4**  
**Introduction to Production and Operations Management**

Su, A, W, Sp. 4 cl.

H630 (honors) may be available to students enrolled in a college honors program or by permission of faculty.

Prereq.: 490 or equiv.

Topics and problems in managing and controlling systems including demand-capacity relationships, product factors, physical factors, process factors, and system maintenance. Hardy.

**640 U G 4**  
**Insurance and Risk**

A, W, Sp. 2 2-hr. cl.

Prereq.: Econ. 200, 201, 400, 402, or equiv.

Principles and practices of insurance and risk management, including personal, business, and social viewpoints in regard to insurance for life, health, property, and liability risks. Bickelhaupt and Close.

**650 U G 4**  
**Marketing**

Su, A, W, Sp. 4 cl.

H650 (Honors) may be available to students enrolled in a college Honors Program or by permission of faculty.

Prereq.: Econ. 200, 201, 400, 402, or equiv.

Critical survey of field of marketing; structure, functions, policies, costs, and problems analyzed from consumer and other viewpoints; emphasis on principles, trends, and quantitative expression. Davidson and Staff.

**660 U G 3**  
**Introduction to Manpower and Industrial Relations**

Su, A, W, Sp. 3 cl.

H660 (Honors) may be available to students enrolled in a college Honors Program or by permission of faculty.

Prereq.: Econ. 400, 402, or equiv.

Principles and practices of recruiting, selecting, developing, collective bargaining, compensating, and utilizing effective manpower resources. Campagna.

**670 U G 4**  
**Real Estate and Urban Land Economics**

A, W, Sp. 2 2-hr. cl.

Prereq.: Econ. 200, 201, 400, 402, or equiv.

Introduction to investment decision making in land resource utilization; consideration of factors such as real estate markets, public influence, legal principles, financing, and administration. Racster and Smith.

**693 U G 2-5**  
**Individual Studies**

Su, A, W, Sp.

Prereq.: Written permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Individual study projects in related areas in business administration.

**694 U G 2-5**  
**Group Studies**

Su, A, W, Sp.

Prereq.: Written permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Group study projects in selected areas in business administration.

**700 U G 5****Management Processes: Planning and Controlling**

Su, A, W, Sp. 5 cl.

Prereq.: 490, 620, 630, 650 or equiv.

Business goals and policies; phases of decision making; analysis of alternatives; establishing, evaluating, and controlling plans of action. Krajewski and Goodman.

**701 U G 5****Management Processes: Organizing**

Su, A, W, Sp. 5 cl.

Prereq.: 490, 620, 630, 650 or equiv.

Establishing, maintaining, and controlling resources to accomplish business objectives; authority and responsibility relationships; formal and informal organizational arrangements; structure of business systems and procedures. Hicks and Murphy.

**703 U G 3****Measurement and Change of Organizational Climate**

W. 3 cl.

Prereq.: 700 and 701.

Examination of organization climate as a variable; methods of measurement, and managerial approaches to altering it. Kerr.

**708 U G 3****Introduction to Administrative Behavior**

Su, A, W, Sp. 2 1½-hr. cl.

Prereq.: Permission of instructor.

Open only to students preparing for grad. work in administration.

Introduction to behavioral concepts of concern to management. Kerr and Murphy.

**720 U G 3****Corporation Finance**

A, W, Sp. 2 1½-hr. cl.

Prereq.: Acc. 711 or equiv.; and Econ. 200, 201, 400, 402, or equiv.

Open only to students preparing for grad. work in business.

A critical study of the field of corporation finance from an economic point of view. Mullins, Ricks, and Staff.

**721 U G 3****Managerial Finance**

A, W, Sp. 3 cl.

Prereq.: 620 or equiv.

Financial management of business units with emphasis on finance organization structure, collecting and using financial data, judging profitability, liquidity, sources of capital, internal financial operations. Foster, Mullins, and Staff.

**722 U G 3****Investment Management**

Su, A, W, Sp. 3 cl.

Prereq.: 620 or equiv.

Investment objectives; types of investments and their relative merits; security prices and yields; investment programs; and taxes. Stone, Harvey, and Staff.

**723 U G 3****Investment Analysis**

W, Sp. 3 cl.

Prereq.: 722 or equiv.

Methods of investment analysis; analysis of investment data; principles and standards for selection of specific investments; portfolio management. Harvey and Stone.

**724 U G 3****The Stock Market**

A, Sp. 3 cl.

Prereq.: 620 or equiv.

Practices, procedures, and regulations relating to listing and to buying and selling securities in the organized security markets. Donaldson.

**725 U G 3****International Finance**

A. 2 1½-hr. cl.

Prereq.: 620 or equiv.

The international financial environment; management of financial risks inherent with international business; problems of implementing corporate finance principles overseas; financial aspects of parent-subsidiary relationships. Ricks.

**726 U G 3****Financial Institutions**

A, W, Sp. 3 cl.

Prereq.: 620 and Econ. 520 or equiv.

Structure, operations, regulation, and economic significance of financial institutions with emphasis on savings, trust, mortgage lending, consumer lending, regulatory, and investment banking institutions. Rapp, Cole, and Staff.

**727 U G 3****Management of Financial Institutions**

Sp. 2 1½-hr. cl.

Prereq.: 726 or equiv.

Examination of the objectives, functions, policies, organization, practices, and procedures of financial institutions from the viewpoint of the institutional management. Cole and Rapp.

**729 U G 3****Cases in Managerial Finance**

A, W, Sp. 2 1½-hr. cl.

Prereq.: 721 or equiv.

Analysis of qualitative and quantitative financial factors involved in managerial decisions in actual business cases. Rapp, Cole, and Staff.

**730 U G 3****Fundamentals of Production and Operations Management**

A, Sp. 2 1½-hr. cl.

Prereq.: 490 or equiv. or permission of instructor.

Open only to students preparing for grad. work in business.

Topics and problems in managing the production and operational systems in various types of organizations; consideration of managerial and economic implications. Krajewski and Hardy.

**731 U G 4**

**Production and Operations Management I**

Su, A, W, Sp. 2 2-hr. cl.

Prereq.: 700, or permission of instructor.

Analysis of capacity related problems, including forecasting, capital investments, product selection and design, maintenance, plant location, materials handling, and facilities design. Hardy and Ritzman.

**732 U G 4**

**Production and Operations Management II**

Su, A, W, Sp. 2 2-hr. cl.

Prereq.: 731 or permission of instructor.

Analysis of operating and control problems, including aggregate planning, scheduling, inventory control, quality assurance, work measurement, and cost analysis. Vitt and Ritzman.

**734 U G 3**

**Analysis and Design of Operating Systems**

W. 3 cl.

Prereq.: A course in computer programming or permission of instructor.

Analysis and design of modern production planning and control systems, including model building and computer simulation. Vitt and Goodman.

**739 U G 3**

**Problems In Production and Operations Management**

A, Sp. 2 1½-hr. cl.

Prereq.: 731, 732, or permission of instructor.

Case study approach to problem-solving and decision-making for production and operations management. Vitt.

**741 U G 4**

**Personal Insurance Planning**

A. 2 2-hr. cl.

Prereq.: 640 or equiv.

Analysis of personal consumer needs for life, health, property, and liability insurance; development of contracts, legal aspects, rates, and the technique of estate programming. Bickelhaupt and Close.

**743 U G 4**

**Insurance Operations and Regulations**

W. 2 2-hr. cl.

Prereq.: 640 or equiv.

Examination of the major functions of insurers of all types; product development, underwriting, rating, reinsurance, marketing systems, loss payment, financial analysis, management, and regulation. Bickelhaupt.

**745 P 4**

**Social Insurance**

A. 2 2-hr. cl.

Study of social insurance systems including Social Security, Unemployment Compensation, Workmen's Compensation, proposed National Health Insurance and their effects on the American economy and society. Bickelhaupt and Close.

**749 U G 4**

**Business Risk Management**

Sp. 2 2-hr. cl.

Prereq.: 640 or equiv.

Development of insurance and risk management programs for business consumers; risk identification, evaluation and treatment; all lines, including group insurance, business life insurance and pensions. Bickelhaupt.

**750 U G 3**

**Marketing**

Su, A, W. 3 cl.

Prereq.: Permission of instructor.

Open only to students preparing for graduate work in business.

A critical study of the field of marketing institutions and functions primarily from a social point of view. Doody, Grabner, and LaLonde.

**751 U G 4**

**Managerial Marketing**

Su, A, W, Sp. 2 2-hr. cl.

Prereq.: 700 and 701 or equiv.

Marketing policies and strategy; organization, demand analysis, product planning, pricing, physical distribution, and promotion from a managerial viewpoint. Davis, Stern, and Talarzyk.

**752 U G 4**

**Cases in Managerial Marketing**

Su, A, W, Sp. 2 2-hr. cl.

Prereq.: 751.

Analysis of marketing policies and strategy, with emphasis on actual business cases. Grabner, Robeson, and Stern.

**753 U G 4**

**Retailing**

A, W, Sp. 4 cl.

Prereq.: 650 or equiv.

Principles and methods of management as applied to retailing, including location, organization, personnel, buying, inventory control, selling and advertising, services, expenses, and profits. Robeson and Staff.

**754 U G 4**

**Wholesaling**

A, Sp. 4 cl.

Prereq.: 650 or equiv.

Nature, history, institutional compositions, competitive factors, economic and government aspects; scientific management of wholesale establishments, including functions of sales, internal operations, and operating expense control. Davis.

**755 U G 4**

**Promotional Strategy**

A, W, Sp. 2 2-hr. cl.

Prereq.: 650 or equiv.

Consumer behavior, fundamentals of communication, setting goals and objectives, creative strategy, media strategy, social and economic issues. Talarzyk and Staff.



**756 U G 4****Credit Administration**

A, W. 2 2-hr. cl.

Prereq.: 650 or equiv.

Nature of credit; social and economic aspects of its use; management strategies in mercantile and consumer credit administration; competitive and legal constraints. Bartels.

**757 U G 4****Environment for International Business**

A, Sp. 4 cl.

Prereq.: 650 or equiv.

International, foreign, and United States environments for global business; trade systems of different nations; management implications of cultural, social, and economic aspects of the environment. Bartels, Cullman, and Ricks.

**758 U G 4****Marketing Research**

A, Sp. 4 cl.

Prereq.: 650 and Econ. 442 or equiv.

The role of research in the solution of marketing problems; emphasis on available data analysis and methods of the field of investigation. Blackwell, Talarzyk, and Staff.

**761 U G 3****Industrial Relations Administration**

A, W. 3 cl.

Prereq.: 660 or 701, or permission of instructor.

Examination of the process of accommodation and rule-making among management, employees, and government relative to their respective goals and strategies, and pertinent legislation and environmental constraints. Miljus and Yaney.

**762 U G 3****Compensation Administration**

W, Sp. 3 cl.

Prereq.: 660 or 701, or permission of instructor.

Managerial aspects of motivation and compensation principles and practices for administrative, operative, research, and professional employees in private and public organizations. Yaney and Campagna.

**769 U G 3****Problems in Manpower and Industrial Relations**

A, Sp. 2 1½-hr. cl.

Prereq.: 761, 762, or permission of instructor.

Problems and case histories are utilized to develop proficiency in applying principles and developing decision-making powers in regard to manpower and human relations areas. Yaney and Campagna.

**771 U G 3****Real Estate Administration**

Sp. 2 1½-hr. cl.

Prereq.: 670 or equiv.

Administration of real estate business in the performance of economic functions; the managerial aspects of brokerage, development, construction, property management, and financial firms. Racster.

**772 U G 3****Real Estate Finance**

A. 2 1½-hr. cl.

Prereq.: 670 or equiv.

Sources and methods of obtaining funds for real estate investment; financial institutions, legal considerations, the construction industry and cycles, and financing policies, practices and experiences. Racster.

**773 U G 3****Real Estate Valuation**

W. 2 1½-hr. cl.

Prereq.: 670 or equiv.

Professional valuation as a guide to business decisions; valuation theory and procedures; factors influencing real estate values, and the selection and analysis of data. Racster.

**780 U G 4****Micro-Logistics**

A. 4 cl.

Prereq.: 700.

Management of logistics activities of the firm from the viewpoint of both the provider and user of logistics system components. Grabner and Robeson.

**781 U G 4****Analysis and Design of Logistics Systems**

Sp. 2 2-hr. cl.

Prereq.: 780 and Econ. 576.

Analysis of internal and environmental factors affecting logistics systems and the effect of such factors on the development and implementation of integrated logistics systems. Robeson and Grabner.

**799 U G 4****Business Policy**

Su, A, W, Sp. 4 cl.

Prereq.: Approved application for B. S. in Business Administration.

Analysis of major policy decisions in the context of the entire philosophical framework of business; emphasis on consideration of interrelationships of major functions of business. Foster and Staff.

**801 G 3****Quantitative Methods in Business**

Su, A, W, Sp. 2 1½-hr. cl.

Prereq.: Math 123 or equiv. and Econ. 442 or equiv.

Derivation and application of analytical, mathematical, and statistical techniques to the solution of recurring management problems.

**801.01 Deterministic**

Su, A, W, Sp.

Harvey, Ritzman, and Pack

**801.02 Stochastic**

A, W, Sp.

Bartos and Gordon.

**801.03 Advanced Quantitative Methods**

Sp.

Bartos.

**802 G 3****Systems Research Organization and Methodology**

A, W, Sp. 1 2-hr. cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 12 cr. hrs.; subdivision not repeatable.

Selection, definition, organization, development, and presentation of a system research project. Howland.

**802.01 Introduction to Management Systems Research**

A.

**802.02 Approaches to Systems Management**

W.

**802.03 Cybernetic Modeling of Adaptive Management Systems**

Sp.

**803 G 3****Formal Organization Theory**

Su, A, W, Sp. 2 1½-hr. cl.

Prereq.: 708 or placement examination.

An introduction to the various sociological and psychological theories which underlie the concept of the formal organization. McNaul, Kerr, and Staff.

**804 G 3****Advanced Topics in Organization Theory**

W. 2 1½-hr. cl.

Prereq.: 803 or permission of instructor.

A continuation of 803 designed for students interested in treating organization concepts in more depth as they pertain to modern business groups. Bobbitt.

**805 G 3****Introduction to Administrative Systems**

Sp. 2 1½-hr. cl.

Prereq.: 803 or permission of instructor.

The organization of an administrative system; types of systems and the problems involved. Behling, Hicks, and Staff.

**807 G 3****Principles and Techniques of Research**

A, Sp.

Prereq.: 801.02

Not open to students with credit for 800.

Principles of research methods in business and the use of research by management; scientific method in business, sampling theory, variable analysis, research cases. Blackwell and Talarzyk.

**809 G 5****Business Policy**

Su, A, W, Sp. 2 2-hr. cl.

Prereq.: Final qtr. of M.B.A. studies or permission of graduate committee.

Examination of fundamental factors in organization and management; analysis of major policy decisions; effects of policy decisions on sales, production, personnel, and finances. Cullman and Staff.

**810 G 3****Government Regulation and Business Decisions**

Sp. 2 1½-hr. cl.

Prereq.: 510 or equiv.

Analysis of methods utilized by government to regulate business and maintain competition, emphasizing the impact of administrative and judicial interpretation upon managerial decisions. Howell, Gibson, and Dunfee.

**811 G 3****The Legal Environment of the Business Firm**

A. 2 1½-hr. cl.

Systems view of interaction of business firm and the legal structure; regulation of form and functional processes; integration of legal advice into the management process. Gibson and Dunfee.

**820 G 3****Advanced Finance**

Su, W, Sp. 2 1½-hr. cl.

Prereq.: 720, Acc. 711 or permission of instructor.

A critical study of internal financial management of business enterprises, based primarily on comprehensive case analyses. Foster, Mullins, and Staff.

**821 G 3****Seminar in Corporate Financial Analysis**

W. 2 1½-hr. cl.

Prereq.: 820 or permission of instructor.

Critical study of the growing number of analytical techniques and research findings that lie between present practices and the frontiers of financial research. Mullins and Foster.

**822 G 3****The Security Market**

Su. 2 1½-hr. cl.

Prereq.: Permission of instructor.

A critical study of the markets for listed and unlisted securities and the factors influencing security prices. Stone.

**823 G 3****Quantitative Methods in Investment Management**

A. 2 1½-hr. cl.

Prereq.: 722 or 822 and 801.02 or equiv. or permission of instructor.

Recent developments in quantitative methods applied to investment analysis and portfolio management including the Markowitz portfolio model, random walk hypothesis, utility in risk analysis and valuation models. Harvey.

**826 G 3****Seminar in Financial Institutions**

Sp. 2 1½-hr. cl.

Prereq.: 726 and 820 or permission of instructor.

Review, analysis, and evaluation of pertinent literature and research findings related to financial institutions. Cole and Rapp.

**830 G 3****Advanced Operations Management**

Su, W, Sp.

Prereq.: 730 or equiv., and 801.01.

A critical survey and examination of the current trends and advanced problems in production and operations management, including analysis and policy formulation. Ritzman and Vitt.

**832 G 3****Design of Operating Systems**

Sp.

Prereq.: 830 or permission of instructor.

A study of problems in the development of productions and operations management, systems design, and operational control processes. Vitt.

**834 G 3****Advanced Topics In Capacity Planning**

Sp. 2 1½-hr. cl.

Prereq.: 830.

A study of current research and mathematical models for selected capacity topics which may include capital input selection, capacity maintenance, facility design, or location assignments. Ritzman.

**835 G 3****Advanced Topics In Operations Analysis**

A. 2 1½-hr. cl.

Prereq.: 830.

Extensive applications of management science techniques for selected topics which may include aggregate planning, production sequencing, inventory theory, or cost analysis. Krajewski and Hardy.

**840 G 3****Seminar in Life and Health Insurance**

A. 1 2-hr. cl.

Prereq.: Permission of instructor.

Critical consideration of current topics of significance in the field of life and health insurance through class discussions and individual research reports. Bickelhaupt and Close.

**841 G 3****Seminar in Property and Liability Insurance**

W. 1 2-hr. cl.

Prereq.: Permission of instructor.

Investigation through class discussion and reports of the current literature on significant topics in property and liability insurance. Bickelhaupt and Close.

**843 G 3****Risk Analysis and Administration**

Sp. 2 1½-hr. cl.

Prereq.: Permission of instructor.

A comprehensive view of general nonspeculative risk problems as well as specific problems in the students' areas of concentration with emphasis on insurance as a tool. Bickelhaupt and Close.

**850 G 3****Advanced Marketing**

Su, A, W.

Prereq.: 750.

A critical study of management of marketing activities in business enterprises, based primarily on comprehensive case analyses. Davis and Stern.

**852 G 1-3****Seminar in Specialized Areas of Marketing**

A, W, Sp.

Prereq.: 650 or equiv.

Repeatable.

Regular class meetings and group discussions of the subject matter embodied by one of the following areas in the field of marketing:

Include decimal with number on schedule card.

- 852.01 Advertising**
- 852.02 Credits and Collections**
- 852.03 Marketing Research**
- 852.04 Retailing**
- 852.05 Sales Management**
- 852.06 Channels of Distribution**
- 852.07 Marketing Theory**
- 852.08 Logistics**
- 852.09 Consumer Research**

**854 G 3****Consumer Behavior**

A, W. 2 1½-hr. cl.

Prereq.: 850 or permission of instructor.

Development of the consumer decision process and its application to marketing strategy decisions. Blackwell, Leavitt, and Talarzyk.

**856 G 3****Multinational Business Administration**

Su, A, W, Sp. 2 1¼-hr. cl.

Prereq.: 757.

Bases of management strategies in multinational companies, including legal forms, organizations, personnel, financing, pricing, antitrust, and risk. Bartels and Ricks.

**857 G 3****Problems in International Business Administration**

W. 2 1½-hr. cl.

Prereq.: 856.

Management decision-making in business enterprises operating in and between many nations. Bartels and Ricks.

**860 G 3****Administration of Interpersonal Behavior**

A, W, Sp.

Prereq.: 708 or placement examination.

Analysis of interpersonal relations, manpower programs and policies, communication practices, and morale factors relative to the effect upon productivity, organizational effectiveness, and personal systems. Miljus, Behling, and Staff.

**861 G 3****Seminar in Industrial Relations Administration**

Su, W. 1 2-hr. cl.

Prereq.: 860 or equiv., or permission of instructor.

Interaction and accommodation processes between institutionalized collective groups of employees and managers of goal oriented organizations located in both the private and public sectors of society. Campagna and Miljus.

**862 G 3****Problems in Manpower Administration**

W. 2 1½-hr. cl.

Prereq.: 860 or equiv., or permission of instructor.

Theory and problems involved in selecting, developing, retaining, motivating, utilizing, and allocating manpower resources within complex organizations. Yaney and Campagna.

**870 G 3****Seminar in Real Estate**

W. 1 3-hr. cl.

Prereq.: 670 plus one of the following: 771, 772, 773, or equiv.

Issues and problems in the economics and administration of real estate resources critically examined through an intensive investigation of the literature. Racster.

**871 G 3****The Urban Environment**

Su. 1 3-hr. cl.

Prereq.: Permission of instructor.

Urban problems and the business man's role in solving them through study of the history of urbanization, functions of urban areas, and community involvement by private and public agencies. Hunker and Racster.

**873 G 3****Urban Real Estate Analysis**

A. 1 3-hr. cl.

Prereq.: Permission of instructor.

The process of analysis and the tools employed in making decisions about the planning, financing, marketing, rehabilitation, and production of real estate resources. Smith and Racster.

**880 G 3****Physical Distribution Management**

A.

Prereq.: 630, 650, Econ. 442 or equiv.

Management of movement services and coordination of demand and supply patterns for optimization of physical systems in terms of cost and customer service. Grabner and LaLonde.

**889 G 3****Theory of Business Logistics**

Sp.

Prereq.: Permission of instructor.

Critical examination of various theories of the structure and operation of logistics systems; research methodology for testing logistics theory and the application of logistics theory to contemporary logistics problems. Lalonde.

**899 G 1-5****Interdepartmental Seminar**

Su, A, W, Sp.

(See under Interdepartmental Seminars.)

**911 G 3****Concepts In Organization and Management**

A, W, Sp. 1 2-hr. cl.

Prereq.: Permission of instructor.

Research and theoretical advances in various aspects of social organization and behavior as they relate to the management of the complex organization. McNaul and Behling.

**912 G 3****Analysis of Organization Theory**

Sp. 1 2-hr. cl.

Prereq.: Permission of instructor.

Not open to students with credit for 903.

Analysis and comparison of recent theories of organization; their integration with older theories. Stogdill.

**913 G 3****Advanced Topics In the Management of Individual Behavior in Formal Organizations**

A. 1 2-hr. cl.

Prereq.: Permission of instructor.

Treats constructs and results drawn from disciplines including psychology, anthropology, information science, and behavioral zoology as applied to motivation and decision-making in formal organizations. Behling.

**914 G 3****Work Groups In the Organizational Setting**

W. 1 2-hr. cl.

Prereq.: Permission of instructor.

Theory and research on formal and informal structures in work groups and their influence on productivity and management. Stogdill and Kerr.

**915 G 3****Management of Formal Organizations**

Sp. 1 2-hr. cl.

Prereq.: Permission of instructor.

Theory and research on the structural characteristics of formal organizations with particular emphasis on the management of the organization as a dynamic system. McNaul.

**917 G 3****Seminar In Integrative Management Theory**

A. 1 2-hr. cl.

Prereq.: Permission of instructor.

The administrative process and the factors and forces within an organization which impinge upon it and affect decision-making. Bobbitt.

**918 G 3****Seminar in Integrative Management Research**

W. 1 2-hr. cl.

Prereq.: Permission of instructor.

A continuation of the general subject matter of 917, focusing upon the manner in which socio-cultural milieu influences organization action. Powell.

**919 G 3****History of Management Thought**

Sp. 1 2-hr. cl.

Prereq.: Permission of instructor.

Seminar in the historical evolution of fundamental concepts underlying the theory and practice of modern management; discussion of pioneers in the management fields. Bobbitt.

**920 G 3****Seminar in Finance**

W. 1 2-hr. cl.

Prereq.: 820 or equiv.

A critical study of current practices, trends, and problems in the field of finance. Foster.

**929 G 3****Industrial Consolidations and Mergers**

Sp. 1 2-hr. cl.

Prereq.: 620 or equiv.

Historical and analytical study of industrial consolidation and mergers. Stone.

**930 G 3**  
**Seminar In Production  
 and Operations Management**

A. 1 2-hr. cl.

Prereq.: Permission of instructor.

A critical analysis of research and emerging theories in the field with emphasis on their social, economic, and physical implications. Ritzman and Vitt.

**931 G 3**  
**Seminar In Production  
 and Operations Management**

W. 1 2-hr. cl.

Prereq.: Permission of instructor.

A continuation of 930 including research methodology and the development of a research proposal. Krajewski and Ritzman.

**950 G 3**  
**Seminar in General Marketing**

A.

Prereq.: 650 or equiv.

A critical study of fundamental principles of marketing; special emphasis on the historical, macro, social, and theoretical aspects of the subject. Cullman and Stern.

**951 G 3**  
**Seminar in General Marketing**

W.

Prereq.: 950 or equiv.

Continuation of 950. Cullman and Davis.

**955 G 3**  
**Seminar in Contemporary Marketing Problems**

Sp.

Prereq.: 650 or equiv.

Repeatable to a maximum of 6 cr. hrs.

Review of current periodical literature and individual investigation by each student of a selected marketing problem of contemporary significance for seminar discussion and written report. Davis and Stern.

**959 G 3**  
**History of Marketing Thought**

A.

Prereq.: 650 or equiv. and permission of instructor.

Evolution of marketing, concepts, terminology, principles, and theory; environmental and personal influences; analysis of marketing literature; marketing thought related to other social sciences. Bartels.

**960 G 3**  
**Seminar In Manpower  
 and Industrial Relations Thought**

A. 1 2-hr. cl.

Prereq.: Permission of instructor.

A consideration of manpower and industrial relations thought in terms of its historical and theoretical evolution in private and public sectors. Miljus and Yaney.

**961 G 3**  
**Seminar In Manpower  
 and Industrial Relations Research**

W. 1 2-hr. cl.

Prereq.: Permission of instructor.

A consideration of relevant manpower research and methodology, and individual development of research projects in private public sectors. Miljus and Campagna.

**998 G Arr.**  
**Research in Business Administration: Thesis**

Su, A, W, Sp.

Research for thesis purposes only.

**999 G Arr.**  
**Research in Business Administration:  
 Dissertation**

Su, A, W, Sp.

Research for dissertation purposes only.

## Ceramic Engineering

Office: 177 Watts Hall, 2041 College Road

**Professors** Blau (Emeritus), Everhart, R. King (Emeritus), Koenig, Metzger, and Russell; **Associate Professors** Campbell, B. King (Emeritus), and Shook (Chairman); **Adjunct Associate Professor** Alexander.

**201 U 3**  
**Introduction to Ceramic Engineering**

A, W, Sp. 3 cl.

Introductory course for ceramic engineering students and a survey of ceramic products, their testing, and their uses for students in disciplines other than ceramic engineering.

**423 U 3**  
**Fundamentals of Ceramic  
 Engineering I: Materials**

W. 3 cl.

Ceramic raw materials, including their geology, processing, physical and thermal behaviors, and industrial applications; introduction to mineral concepts, and to the glassy and crystalline states. Russell.

**424 U 3**  
**Fundamentals of Ceramic  
 Engineering II: Processing**

Sp. 2 cl., 1 3-hr. lab.

Prereq.: 201.

Preparation of ceramic materials and measurement and control of the principal process parameters, with emphasis on the relationship between structure, properties, and production economics. Shook.

**425 U 3**  
**Heat Processes I**

A. 3 cl.

Prereq.: 424.

Fuel sources and economy in ceramic drying, firing, or melting; heat release and utilization, temperature measurements and control. Shook.

**930 G 3****Seminar In Production and Operations Management**

A. 1 2-hr. cl.

Prereq.: Permission of instructor.

A critical analysis of research and emerging theories in the field with emphasis on their social, economic, and physical implications. Ritzman and Vitt.

**931 G 3****Seminar In Production and Operations Management**

W. 1 2-hr. cl.

Prereq.: Permission of instructor.

A continuation of 930 including research methodology and the development of a research proposal. Krajewski and Ritzman.

**950 G 3****Seminar in General Marketing**

A.

Prereq.: 650 or equiv.

A critical study of fundamental principles of marketing; special emphasis on the historical, macro, social, and theoretical aspects of the subject. Cullman and Stern.

**951 G 3****Seminar in General Marketing**

W.

Prereq.: 950 or equiv.

Continuation of 950. Cullman and Davis.

**955 G 3****Seminar in Contemporary Marketing Problems**

Sp.

Prereq.: 650 or equiv.

Repeatable to a maximum of 6 cr. hrs.

Review of current periodical literature and individual investigation by each student of a selected marketing problem of contemporary significance for seminar discussion and written report. Davis and Stern.

**959 G 3****History of Marketing Thought**

A.

Prereq.: 650 or equiv. and permission of instructor.

Evolution of marketing, concepts, terminology, principles, and theory; environmental and personal influences; analysis of marketing literature; marketing thought related to other social sciences. Bartels.

**960 G 3****Seminar In Manpower and Industrial Relations Thought**

A. 1 2-hr. cl.

Prereq.: Permission of instructor.

A consideration of manpower and industrial relations thought in terms of its historical and theoretical evolution in private and public sectors. Miljus and Yaney.

**961 G 3****Seminar In Manpower and Industrial Relations Research**

W. 1 2-hr. cl.

Prereq.: Permission of instructor.

A consideration of relevant manpower research and methodology, and individual development of research projects in private public sectors. Miljus and Campagna.

**998 G Arr.****Research in Business Administration: Thesis**

Su, A, W, Sp.

Research for thesis purposes only.

**999 G Arr.****Research in Business Administration: Dissertation**

Su, A, W, Sp.

Research for dissertation purposes only.

## Ceramic Engineering

Office: 177 Watts Hall, 2041 College Road

**Professors** Blau (Emeritus), Everhart, R. King (Emeritus), Koenig, Metzger, and Russell; **Associate Professors** Campbell, B. King (Emeritus), and Shook (Chairman); **Adjunct Associate Professor** Alexander.**201 U 3****Introduction to Ceramic Engineering**

A, W, Sp. 3 cl.

Introductory course for ceramic engineering students and a survey of ceramic products, their testing, and their uses for students in disciplines other than ceramic engineering.

**423 U 3****Fundamentals of Ceramic Engineering I: Materials**

W. 3 cl.

Ceramic raw materials, including their geology, processing, physical and thermal behaviors, and industrial applications; introduction to mineral concepts, and to the glassy and crystalline states. Russell.

**424 U 3****Fundamentals of Ceramic Engineering II: Processing**

Sp. 2 cl., 1 3-hr. lab.

Prereq.: 201.

Preparation of ceramic materials and measurement and control of the principal process parameters, with emphasis on the relationship between structure, properties, and production economics. Shook.

**425 U 3****Heat Processes I**

A. 3 cl.

Prereq.: 424.

Fuel sources and economy in ceramic drying, firing, or melting; heat release and utilization, temperature measurements and control. Shook.

**426 U 4****Heat Processes II**

Sp. 3 cl., 1 3-hr. lab.

Prereq.: 425; concur. 552.

Psychrometry in drying operations and drier calculations; reactions of ceramic products during drying and firing; melting and crystallization control. Shook.

**489 U 2****Inspection Trip**

Su, A, W, Sp. 6 approved plant visits.

Visits to a variety of modern ceramic operations as arranged by the department throughout the academic year.

**510 U G 3****Thermodynamics of Ceramic Materials**

A. 3 cl.

Prereq.: Chem. 521 or 533.

Applications of thermodynamics to ceramic systems, including non-stoichiometry and interfacial relationships. Alexander.

**511 U G 3****Ceramic Rate Processes**

W. 3 cl.

Prereq.: 510 or equiv., and Chem. 521.

Introduction to chemical kinetics and rate processes of ceramic materials with emphasis on interrelation of heat transfer and reaction rate. Campbell.

**512 U G 4****Ceramic Materials Science I**

W. 4 cl.

Prereq.: Chem. 521 or 533.

Not open to students with credit for 611.

Structure of crystals, crystal chemistry and physics, chemical bonds and atomic coordination in inorganic, non-metallic materials; silicate and defect structures emphasized.

**513 U G 4****Ceramic Materials Science II**

A. 4 cl.

Prereq.: 512.

Not open to students with credit for 612 or 613.

Structural imperfections and atomic mobility at high temperatures; development of ceramic microstructure; mechanical, optical, and electrical properties with heat treatment. Shook.

**529 U 4****Ceramic Process and Product Control**

W. 4 cl.

Prereq.: 4th yr. standing or permission of instructor.

The application of control methods for processes and products. Everhart.

**531 U G 4****Glass Science and Technology**

Sp. 3 cl., 1 3-hr. lab.

Prereq.: 512.

Not open to students with credit in 631.

Structure and properties of glasses considered as undercooled liquids with emphasis on commercially important compositions. Hicks.

**551 U G 4****Ceramic Characterization I**

W. 4 cl.

Prereq.: 510.

Application of analytical techniques and concepts including the analysis of structures, phases, and particulate matter by microscopic, diffractive, spectroscopic, chemical, and other approaches. Alexander.

**552 U G 3****Ceramic Characterization II**

Sp. 3 cl.

Concur.: 426.

Analytical measurements of ceramic material thermal responses, including adiabatic and dynamic calorimetry, thermogravimetric analysis, effluent gas measurements and conventional DTA. Campbell.

**589 U 5****Industrial Experience**

Su, A, W, Sp.

Repeatable to a maximum of 10 cr. hrs.

Ten weeks practical experience or its equivalent, including written report, in approved factory manufacturing ceramic wares.

**612 U G 4****Advanced Ceramic Materials Science I**

A. 4 cl.

Prereq. or concur.: 510 or equiv.

Materials science in the areas of crystal and surface chemistry, colloids, rheology of plastic and solid states, and thermal and optical properties.

**613 U G 4****Advanced Ceramic Materials Science II**

W. 4 cl.

Prereq.: 510 or equiv.

Materials science in areas of defect structures and atomic mobility, sintering and vitrification kinetics; development of ceramic microstructure, dielectric, ferroelectric, magnetic, and mechanical properties. Shook.

**621\* U G 5****Ceramic Plant Design**

Sp. 4 cl., 1 2-hr. lab.

Prereq.: 529 and Engr. Mech. 420.

The concepts of ceramic plant layout with regard to processing equipment; project planning and updating techniques. Shook.

**632 U G 4****Ceramic Technology**

W. 2 cl., 2 3-hr. lab.

The technology of porcelain enamels and surface coatings for metals. Koenig.

**633 U G 4****Ceramic Technology**

Sp. 2 cl., 2 3-hr. lab.

The technology of refractories, structural clay products, and abrasives. Metzger.

**634 U G 4****Ceramic Technology**

A. 2 cl., 2 3-hr. lab.

The technology of fine grained ceramics, including traditional white wares, electronic and technical ceramic materials, and glazes. Russell.

**671 U G 3****Bioceramics**

A, W, Sp. 2 cl., 1 3-hr. lab.

Prereq.: Elec. E. 670 or permission of instructor.

Evaluation and characterization of ceramic materials for medical applications. Campbell.

**693 U G 1-7****Individual Studies**

Su, A, W, Sp. Conf., library, and lab. work.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Ceramic investigations in areas of advanced non-thesis research.

**694 U G 1-6****Group Studies in Ceramic Engineering**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

**711† U G 4****Ceramic Materials Science II**

W. 4 cl.

Prereq.: 512.

Combinations of the glassy and crystalline states; heterogeneous crystal systems; interfacial conditions, internal stress states, interstate bonds, and micro and macro structure. Shook.

**712† U G 4****Advanced Ceramic Materials Science I**

A. 4 cl.

Prereq.: 711 or permission of instructor.

Materials science in the areas of crystal chemistry, colloids, surface phenomena, and rheology of plastic and solid states; thermal and optical properties.

**713† U G 4****Advanced Ceramic Materials Science II**

A. 4 cl.

Prereq.: 711.

Defect structures, diffusion, and electrical conductivity; solid state reactions, nucleation and growth in ceramic systems; ceramic microstructures. Shook.

**715 U G 3****Thermoanalytical Techniques**

A. 2 cl., 1 3-hr. lab.

Prereq.: Permission of instructor.

Differential thermal analysis, thermogravimetric analysis and dynamic differential calorimetry of changes of state and reactions including mathematical and graphical data reduction. Campbell.

**741 U G 3****The Chemistry and Chemical Processes of Glass Technology**

A. 3 cl.

Prereq.: 512 and 531.

The practical processes and equipment for producing commercial molten glasses, including the selection and handling of materials, charging, processes in the furnace, types of furnaces, furnace design, and operation. Koenig.

**742 U G 4****Glass Technology**

A. 4 cl.

Prereq.: 741 or permission of instructor.

Machine processes for forming pressed, blown, and flatware; annealing, tempering and decorating; plant visits to observe current commercial practice. Hicks.

**785 U G 3****Ceramic Research Methods**

A. 1 cl., 6 lab. hrs.

Prereq.: 711.

Introduction to research experience; organization and planning; initiating specific research, designed in combination with 786 to give experience in individual and group research. Campbell and Staff.

**786 U G 3****Ceramic Research Methods**

W. 9 lab. hrs.

Prereq.: 785.

Continuation of 785 with accent on the conduct of specific research problems.

**790 U G 3****Ceramic Case Histories**

Sp. 3 cl.

The study of selected case histories in ceramic technological and industrial problems; designed to give experience in individual and group thinking in problem solution. Everhart.

**791 U G 3****Ceramic Case Histories**

Sp. 3 cl.

Individual and group consideration of ceramic problems having technologic, industrial, and/or professional significance. Russell.

**852 G 3****Advanced Physics and Chemistry of Glasses**

Sp. 2 cl.

Prereq.: 631, or permission of instructor.

Glass structure related to composition and liquid structure, equilibrium atomic configurations, energy relationships, kinetics of crystallization, and controlled devitrification in theory and in practice.



853 G 4

**Advanced Ceramic Physics and Chemistry**

W. 4 cl.

Prereq.: Permission of instructor.

Reactions between solid phases, including sintering; the application of phase equilibria to ceramic problems; oxide ceramics and thermodynamics. Alexander.

854 G 4

**Advanced Ceramic Physics and Chemistry**

Sp. 4 cl.

Prereq.: Permission of instructor.

Special properties of crystals; organic chemistry, ultrasonics, and thermodynamics applied to ceramics; nonoxide ceramics. Alexander.

855 G 4

**Advanced Ceramic Science**

W. 4 cl. or conf.

Prereq.: 711 or equiv.

Study of fine-grained ceramic materials for electronic and technical use, with emphasis on electrical phenomena and structure-property relationships. Russell.

856 G 4

**Advanced Ceramic Science**

Sp. 4 cl. or conf.

Prereq.: 711 or equiv.

Modern engineering materials from the viewpoint of ceramic science; thermal behavior, ceramic-metal systems, sandwich and fiber composites, space material problems, plasma and vapor deposition technology.

889 G 1 or 2

**Seminar in Ceramic Engineering**

A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 6 cr. hrs.

Conference and reports on problems in ceramic science, technology and engineering; topics chosen to cover the development of the ceramic industry.

993 G 1-6

**Individual Studies**

Su, A, W, Sp.

Repeatable to a maximum of 6 cr. hrs.

994 G 1-6

**Group Studies**

Su, A, W, Sp.

Repeatable to a maximum of 6 cr. hrs.

999 G Arr.

**Research in Ceramic Engineering**

Su, A, W, Sp.

Research for thesis or dissertation purposes only.

## Chemical Engineering

Office: 121 Chemical Engineering Building, 140 West 19th Avenue

**Professors** Syverson (Chairman), Brodkey, Freeh, Geankoplis, Kay, Koffolt, and Smith; **Associate Professors** Hershey, Lynn (Alcoa), Sheets, Shumate, Slider, Svanks, and Sweeney; **Adjunct Associate Professors** Bates, Eckert, Lemmon, and Martin; **Assistant Professors** Haering and Heibel.

200 U 3

**Chemical Engineering and Process Calculations**

A, W. 2 cl., 2 comp. lab. hrs.

Prereq. or concur.: Physics 131, Math. 152, and Chem. 122 or 205 or equiv.; or permission of instructor.

Not open to students with credit for 400.

The application of physico-chemical principles to problems of the chemical industry; emphasis on graphical method, stoichiometry, heat, and material balances. Geankoplis, Heibel, Hershey, and Smith.

201 U 3

**Chemical Engineering and Process Calculations**

W, Sp. 2 cl., 2 comp. lab. hrs.

Prereq.: 200.

Not open to students with credit for 401.

Continuation of 200.

420 U 3

**Elements of Chemical Engineering—  
Transport Phenomena I**

Sp. 2 cl., 2 comp. lab. hrs.

Prereq. or concur.: 201, Math. 255, and Physics 132; or permission of instructor.

Introduction to momentum, mass, and heat transfer with emphasis on the analogies between the transports; numerous computation problems illustrate applications to chemical engineering practice. Brodkey.

442 U 3

**Petroleum Geophysical and Drilling Methods**

W. 3 cl.

Prereq.: Engr. 3rd yr. standing or Geol. 4th yr. standing.

Not open to students with credit in Petr. E. 442.

Selected engineering problems associated with drilling oil and gas wells; geophysical exploration concepts; emphasis on drilling mud control and directional drilling analysis. Slider.

485 U 2

**Inspection Trip**

Sp. 1 wk. between W. and Sp. Qtrs.

Not open to students with more than 2 cr. hrs. for 685.

Repeatable to a maximum of 4 cr. hrs.

These trips will give some practical knowledge of the magnitude of modern chemical engineering operations from a selected variety of industry; the total cost will average about \$90. Syverson.

489 U 5

**Chemical Engineering Practice Work**

A. 10 weeks approved work experience.

Prereq.: Chem. E. 3rd yr. standing.

The equivalent of ten weeks spent in a factory, or the engineering department of an industrial plant, or organized industrial work between 3rd and 4th year in chemical engineering. Syverson.

**494 U 1-5****Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 5 cr. hrs.

Group study in selected areas of chemical engineering.

**508 U G 3****Chemical Engineering Thermodynamics**

A. 2 cl., 2 comp. lab. hrs.

Prereq.: 201.

Not open to students with credit for 608.

Application of the fundamental concepts and laws of thermodynamics to problems of the chemical industry; stress on computational problem work.

**509 U G 3****Chemical Engineering Thermodynamics**

W. 2 cl., 2 comp. lab. hrs.

Prereq.: 508.

Not open to students with credit for 609.

Continuation of 508.

**520 U G 3****Transport Phenomena**

A, Sp. 2 cl., 2 comp. lab. hrs.

Prereq.: Math. 255.

Not open to students with credit for 420.

Momentum, mass, and heat transfer with emphasis on the analogies between the transports; numerous computation problems illustrate applications to engineering practice. Brodkey.

**521 U G 3****Elements of Chemical Engineering—Transport Phenomena II**

A. 2 cl., 2 comp. lab. hrs.

Prereq.: 420 or 520, Math. 255, and concur. Math. 512; or permission of instructor.

Continuation of transport theory and introduction to radiation as applied to heat transfer; basic principles developed and illustrated with problems from chemical engineering practice. Hershey and Sweeney.

**522 U G 3****Elements of Chemical Engineering—Transport Phenomena III**

W. 2 cl., 2 comp. lab. hrs.

Prereq.: 521 or equiv., or permission of instructor.

Not open to students with credit for 611.

Continuation of the study of transport theory; emphasis on mass transfer and stagewise operations with applied computational problems. Geankoplis and Hershey.

**523 U G 4****Chemical Engineering Operations**

Sp. 3 cl., 2 comp. lab. hrs.

Prereq. or concur.: 522, Chem. 532, or permission of instructor.

Not open to students with credit for 612.

The application of the transport phenomena as fluids, heat, and mass transfer to the chemical engineering operations of evaporation, distillation, drying, etc. Haering.

**542 U G 3****Drilling Fluids**

W. 1 cl., 2 3-hr. lab.

Prereq.: 442.

Not open to students with credit in Petr. E. 542.

Significance and control of drilling fluid qualities; commercial drilling fluids analyzed in the laboratory and the control of their properties demonstrated. Slider.

**543 U G 2****Physical Analysis of Petroleum Reservoirs**

W. 1 cl., 1 4-hr. lab.

Prereq.: 442 or permission of instructor.

Not open to students with credit in Petr. E. 543.

Quantitative study of the physical nature of a petroleum reservoir; includes laboratory analysis of porosity, permeability, saturation, capillary pressure, and multiphase characteristics of reservoir rocks. Slider.

**570 U G 3****Fundamentals of Mass Transport and Diffusion**

Sp. 2 cl., 2 comp. lab. hrs.

Prereq.: 8 cr. hrs. of Chem., 10 cr. hrs. of Physics, and Math. 254 or 221 or equiv.; or permission of instructor.

Fundamental study of mass transport and diffusion in gases, liquids, and solids with applications in physical sciences; primarily for students in physical, biological, and engineering sciences. Geankoplis.

**571 U G 3****Air Pollution**

Sp. 3 cl.

Prereq.: Permission of instructor.

Intended for students not enrolled in College of Engineering.

Sources and dispersion of air pollutants, air pollution control, air quality criteria, emission standards and regulations. Sweeney.

**610 U G 3****Chemical Engineering Kinetics**

A. 2 cl., 2 comp. lab. hrs.

Prereq.: 509, 523, and Chem. 533.

Chemical and engineering principles for the design and operation of chemical reactors; kinetics of simple homogeneous systems and introduction to heterogeneous catalysis. Syverson.

**625 U G 3****Chemical Process Dynamics and Control I**

Sp. 2 cl., 4 lab. hrs.

Prereq.: 523 or equiv. or permission of instructor; for other than Chem. E. students, permission of instructor.

Not open to students with credit for 725.

Study of the dynamics and control of chemical processes; mathematical models of simple processes (including control) are derived and simulated using computers. Freeh.

**630 U G 4-8****Chemical Engineering Operations Laboratory**

Su. 5 conf., 7-19 lab. hrs.

Prereq.: 523 and 625, or permission of instructor.

Not open to students with credit for 730.

The fundamental laboratory course in the chemical engineering operations; laboratory investigation of the operating characteristics and efficiency of chemical engineering equipment as distillation, drying, filtration, etc. Haering.

**640 U G 5****Determination of Reservoir Parameters and Material Balance**

Sp. 5 cl.

Prereq.: Engr. 3rd yr. standing; Geol. 4th yr. standing and permission of instructor.

Not open to students with credit in Petr. E. 544 and 641, or Chem. E. 544 and 641.

Determination of petroleum subsurface reservoir thickness, porosity, and saturation from core analysis and logs; the prediction of reservoir behavior by material balance. Slider.

**643 U G 5****Flow of Gas and Oil in Subsurface Reservoirs**

A. 5 cl.

Prereq.: Engr. 4th yr. standing; Geol. 4th yr. standing and permission of instructor.

Not open to students with credit for Petr. E. 642 or Chem. E. 642.

Fundamentals of oil and gas flow in porous media under steady state and unsteady state conditions; application of these fundamentals to well problems. Slider.

**671 U G 3****Environmental and Technological Regulation**

A. 3 cl.

Prereq.: Senior standing in College of Engineering or in science or permission of instructor.

The regulation of technology, especially of the environment and the workplace, from the viewpoint of the engineer and scientist working in an industrial or consulting situation. Sweeney.

**693 U G 2-8****Individual Studies in Chemical Engineering**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

**694 U G 2-6****Group Studies in Chemical Engineering**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

**714 U G 5****Environmental Pollution Abatement**

W. 5 cl.

Prereq.: Senior or grad. majors in engineering or sciences.

Not open to students with credit for Agr. E. 714, Civil E. 714, and Met. E. 714.

(Cross-listed in the Depts. of Agr. E., Civil E., and Met. E.)

Problems, philosophies, principles, and methods of pollution abatement in the total environment; quantitative approaches to waste management in air, water, and land systems.

**726 U G 3****Chemical Process Dynamics and Control II**

A. 3 cl.

Prereq.: 625 or permission of instructor.

Further development of process dynamics and control topics begun in 625. Freeh.

**743 U G 1-10****Petroleum Production Investigations**

A, W, Sp. Library, conf., and lab. work.

Prereq.: 643.

Not open to students with credit in Petr. E. 743.

Repeatable to a maximum of 10 cr. hrs. for the course; either subdivision repeatable to a maximum of 10 cr. hrs.

**743.01 Engineering Problems of Petroleum and Natural Gas Exploration, Production, and Transportation.** Slider.

**743.02 Design or Planning of Petroleum Field Development.** Slider.

**750 U 1****The Profession of Chemical Engineering**

A. 1 cl.

Prereq.: Chem. E. senior standing.

The code of ethics of the chemical engineer, professional registration, responsibilities to the societies of the profession, to management, to labor, and as an administrator. Syverson.

**760 U G 3****Chemical Engineering Economy**

A. 2 cl., 2 comp. lab. hrs.

Prereq.: 630 or permission of instructor.

Economic consideration in research development, design, and manufacturing in the chemical process industry; cost estimation and economic optimization of chemical engineering operations and chemical processes. Freeh, Lynn, and Syverson.

**761 U G 3****Chemical Engineering Processes**

A. 2 cl., 2 comp. lab. hrs.

Prereq.: 509 and 523; concur. 610 and 760; or permission of instructor.

Integration of fundamentals of chemistry, chemical engineering operations, thermodynamics, reaction kinetics, and economics for optimum design and operation of chemical process plants. Hershey and Lynn.

**762 U G 4****Chemical Engineering Process Development**

W. 1 cl., 11 lab. hrs.

Prereq.: 630, 760, and 761; or equiv.

Library, laboratory, and pilot plant research and development of chemical processes of industrial potential justified by preliminary economic studies; preparation of optimum process flow sheets; plant design studies. Heibel, Lynn, and Sweeney.

**763 U 2**  
**Analysis and Organization  
 of Special Project Problem Investigations**

W. 6 hrs. conf. and lab.

Prereq.: Chem. E. 5th yr. standing.

Analysis of definite problems having the theoretical and practical application to the chemical industry; individual effort guided by a chemical engineering staff member. Syverson.

**764 U G 5**  
**Chemical Engineering Process Design**

Sp. 3 cl., 2 4-hr. lab.

Prereq.: 762.

Process design studies on selected chemical processes encompassing a broad spectrum of fundamental engineering principles; optimization studies utilizing economic and technical simulation. Haering, Heibel, and Syverson.

**770 U G 3**  
**Applied Electrochemistry**

W. 2 cl., 4 lab. hrs.

Prereq.: Chem. 533 or permission of instructor.

The relationship between electrical and chemical energy as applied to chemical industries, discussed and illustrated by laboratory work. Lynn.

**771 U G 3**  
**Air Pollution**

Sp. 3 cl.

Prereq.: Senior standing in the College of Engineering or permission of instructor.

Sources of air pollutants, properties of small particles, chemistry of air pollution, dispersion and deposition of air pollutants, and air pollution control. Sweeney.

**773 U G 3**  
**Introduction to High Polymer Engineering**

A. 3 cl.

Prereq.: 610 and Organic Chem. or permission of instructor.

Engineering of polymerization and polymer forming processes based upon thermodynamics, transport phenomena, and reaction kinetics; relationship of engineering properties of high polymers to molecular characteristics. Lynn.

**775 U G 3**  
**Rheology of Fluids**

W. 3 cl.

Prereq.: 420; permission of instructor for students not majoring in Chem. E.

Principles of rheology including the characteristics of non-Newtonian materials, measurements, rheological equations of state, viscometric flows, and applications to the flow of industrial materials. Brodkey.

**776 U G 3**  
**Principles of Polymer Conversion Operations**

Sp. 3 cl.

Prereq.: 773 and 775; or permission of instructor.

Principles of thermodynamics, transport phenomena, polymer chemistry and physics will be related to polymer processing (converting high polymers) through application of mathematical and analytical approaches. Lynn.

**778 U G 3**  
**Nuclear Chemical Engineering**

W. 3 cl.

Prereq.: Nuclear E. 763 or permission of instructor.

A study of physical, chemical, and economic principles applied to the processing of reactor fuels; examination of the separation requirements in relation to different fuel cycles. Smith.

**779 U G 3**  
**Chemical Engineering Experimental Design**

A. 3 cl.

Prereq.: Engr. Gr. 200 or equiv., or permission of instructor.

Industrial and research experiments designed with special emphasis on reducing the number of experiments, interpreting final results, and ensuring against unknown factors. Hershey.

**781 U G 3**  
**Chemical Engineering Optimization**

Sp. 3 cl.

Prereq.: Engr. Gr. 200 or equiv., or permission of instructor.

Description, analysis, and comparison of the techniques now in use in unimodel optimization; linear programming; geometric programming. Hershey.

**785 U G 5 or 6**  
**Special Project Problem Investigations**

Su, A, W, Sp. 15 hrs. conf. and lab.

Prereq.: 763 or permission of instructor.

Repeatable to a maximum of 12 cr. hrs.

Solution of study problems, either new or continued from 763; extensive theoretical and/or experimental work followed by a comprehensive report.

**790 U G 3**  
**Process Modeling and Simulation**

Sp. 3 cl.

Prereq.: Permission of instructor.

Application of basic chemical engineering principles to construct mathematical models of industrial processes and the simulation thereof by digital and analog techniques. Freeh.

**796 U G 2**  
**Advanced Petroleum Engineering Technology**

Sp. 2 cl.

Prereq.: 643.

Not open to students with credit in Petr. E. 796 (765).

Library research and seminar discussions of the most recent technical developments in petroleum engineering. Slider.

**801 G 1-15**  
**Advanced Special Problems  
 in Chemical Engineering**

Su, A, W, Sp. Conf., library and/or lab.

Prereq.: Satisfactory courses in field of problem undertaken and permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

A minor problems course covering the chemical engineering operation, instrumentation, thermodynamics, kinetics, the transport fields, and chemical technology.

**808 G 3****Advanced Chemical Engineering Thermodynamics**

A. 3 cl.

Prereq.: 509 and 523; or permission of instructor.

Detailed discussion of the thermodynamic properties of pure compounds and mixtures; computational problem work emphasizes the application of thermodynamics in industrial problems.

**809 G 3****Advanced Chemical Engineering Thermodynamics**

W. 3 cl.

Prereq.: 808.

Continuation of 808.

**812 G 3****Advanced Chemical Engineering Kinetics**

W. 3 cl.

Prereq.: 523 and 610; or permission of instructor.

Chemical engineering kinetics from the viewpoint of industrial chemical processes. Haering.

**813 G 3****Advanced Chemical Engineering Kinetics**

Sp. 3 cl.

Prereq.: 812.

Continuation of 812. Haering.

**815 G 3****Advanced Chemical Engineering Science and Applications**

A, W, Sp. 3 cl.

Prereq.: Chem. Engr. grad. standing or permission of instructor.

Repeatable to a maximum of 45 cr. hrs.; subdivision not repeatable.

This series of courses presents advanced concepts of science and engineering as applied to the chemical engineering field under various topics.

**815.01 Advanced Mass Transfer—I****815.02 Advanced Mass Transfer—II****815.03 Advanced Distillation and Stage Processes****815.04 Extraction, Azeotropic, and Extractive Distillation****815.05 Advanced Heat Transfer—I**  
Conduction, radiation and convection.**815.06 Advanced Heat Transfer—II**  
Condensation, boiling, design applications.**815.07 Drying, Humidification, and Dehumidification****815.08 Advanced Momentum Transfer—I**  
Basic theory, laminar flow, and phenomenological turbulence.**815.09 Advanced Momentum Transfer—II**  
Statistical turbulence and mixing.**815.10 Advanced Momentum Transfer—III**  
Two-phase phenomena.**815.11 Advanced Combustion Principles****815.12 Advanced Instrumentation and Process Control of Chemical Plants****815.13 Design of Experiments**  
Data handling and analysis, quality control, linear programming.**815.14 Advanced Process and Plant Design****815.15 New or Unusual Chemical Engineering Operations**

Examples: adsorption, atomolysis, dialysis exclusion, sublimation.

**830 G 2-6****Advanced Chemical Engineering Operations Laboratory**

Su, A, W, Sp. 1 conf., 5-17 lab. hrs.

Prereq.: 509 and 523; prereq. or concur. 630; or permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Chemical engineering fundamentals and operations. Haering.

**842 G 3-10****Petroleum Production and Oil Field Development and Operational Problems**

Sp.

Prereq.: Permission of instructor.

Not open to students with credit in Petr. E. 842.

Examination and testing of petroleum and petroleum bearing rocks; economic interpretation and application to problems of primary and secondary recovery. Slider.

**862 G 5****Advanced Chemical Engineering Process Development**

W. 1 cl., 14 lab. hrs.

Prereq.: 610, 760, and 830.

Original work on development of a new process; basic data for process design and preliminary cost estimate required. Heibel, Lynn, and Sweeney.

**873 G 3****Advanced High Polymer Engineering**

Sp. 3 cl.

Prereq.: 773 or permission of instructor.

Fundamental studies of polymer properties as related to and controlled by polymer structure; engineering of polymerization process to control polymer structure. Lynn.

**881 G 2****Seminar in Chemical Engineering**

Su, A, W, Sp. 2 conf. hrs.

Prereq.: Grad. standing in Chem. E.

Repeatable to a maximum of 12 cr. hrs.

Formal reports, lectures, and discussions of fundamentals and new developments in science and technology as related to chemical engineering.

**999 G Arr.****Research in Chemical Engineering**

Su, A, W, Sp.

Research for thesis or dissertation purposes only.

## Chemistry

Office: 120 McPherson Chemical Laboratory, 140 West 18th Avenue; General Chemistry Office: 115 McPherson Chemical Laboratory, 140 West 18th Avenue.

**Professors** Dorfman (Chairman), Bowerman, (Administrative Vice Chairman), Busch, Caley (Emeritus), Calvert, Firestone, Fraenkel, Garrett (Emeritus), Gassman, Harris (Emeritus), Haskins (Emeritus), Hine, Horton, Kuwana, Leussing, Levine (Battelle Professor), Lippincott, Meek, Newman (**Regents Professor**), Ouellette, Paquette, Rubin, Schechter, Shore, Sweet, Taylor, Van Winkle, Verhoek, Watters, and Wojcicki; **Adjunct Professors** Kern (Academic Vice Chairman) and Shavitt; **Associate Professors** Anderson, Gerkin, Klapper, Kurbatov (Emeritus), MacWood, Mathews, Pitzer, Schram, and Swenton; **Assistant Professors** Berliner, Corfield, Frey, Kluge, Mayer, and Parson.

### 101 U 5 Elementary Chemistry

A, W, Sp. 4 cl., 3 lab. hrs.

Prereq.: Eligibility to enroll in Math. 116.

Not open to students with credit for 111, 121, H201, or 204.

A course in the principles of chemistry; the chemistry of the more important elements and compounds.

### 102 U 5 Elementary Chemistry

A, W, Sp. 4 cl., 3 lab. hrs.

Prereq.: 101.

Not open to students with credit for 112, 122, H202, or 205.

Continuation of 101; a terminal sequence in chemistry for students requiring only two courses in chemistry; special attention is given to the compounds of carbon.

### 121 U 5 General Chemistry

Su, A, W, Sp. 3 cl., 3 lab. hrs.

Prereq.: One unit of high school Chem., and eligibility to enroll in Math. 150.

Not open to students with credit for 102, 111, H201, or 204.

A general course in fundamental chemical principles.

### 122 U 5 General Chemistry

Su, A, W, Sp. 3 cl., 3 lab. hrs.

Prereq.: 121; or completion of 101 with a grade of A or B and eligibility to enroll in Math. 150.

Not open to students with credit for 112, H202, or 205.

Continuation of 121; the chemistry of the most important non-metals and of chemical reactions in solutions.

### 123 U 5 General Chemistry

Su, A, W, Sp. 3 cl., 6 lab. hrs.

Prereq.: 122.

Not open to students with credit for 113.

Continuation of 122; the chemistry of the metals including introductory quantitative analysis.

### 194 U 3-5

#### Group Studies

A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

Designed to give students an opportunity to pursue special studies in chemistry.

### H201 U 5 General Chemistry

A. 3 cl., 4 lab. hrs.

Prereq.: Superior performance on placement examination and Math. 151 or equiv.

Not open to students with credit for 101, 111 or 121.

The principles of chemical measurement for selected students.

### H202 U 5 General Chemistry

W. 3 cl., 4 lab. hrs.

Prereq.: 201.

Continuation of 201; the properties of matter and quantitative analysis.

### H203 U 5 General Chemistry

Sp. 3 cl., 4 lab. hrs.

Prereq.: 202.

Continuation of 202; systematic chemistry of the elements.

### 204 U 4 Principles of Chemistry

A, W, Sp. 3 cl., 1 3-hr. lab.

Prereq.: Engr. 1st or 2nd yr. curriculum; 1 unit of high school Chem.; prereq. or concur. Math. 153 and Physics 133.

Fundamental principles of chemistry for engineering students with at least two quarters of college physics and of college mathematics.

### 205 U 4 Principles of Chemistry

W, Sp. 3 cl., 1 3-hr. lab.

Prereq.: 204.

Continuation of 204.

### 211 U 3 Quantitative Analysis

Su, A, W, Sp. 2 cl., 5-8 lab hrs.

Prereq.: 113, or 123, or equiv.

A general course in quantitative analysis; gravimetric, volumetric, and instrumental analysis; primarily for those students with interest in biological and medical sciences.

### 212 U 3 Quantitative Analysis

Su, W, Sp. 2 cl., 5-8 lab. hrs.

Prereq.: 211.

Continuation of 211.

**221 U 5****Quantitative Analysis**

A, Sp. 3 cl., 6 lab. hrs.

H221 (honors) may be available to students enrolled in a college honors program; others with permission of dept.

Prereq.: 123 or equiv.

The fundamental course in quantitative chemical analysis for students majoring in chemistry.

**235 U 5****Survey of Organic Chemistry**

Sp. 4 cl., 1 4-hr. lab.

Prereq.: 102 or 122.

Not open to students with credit for 231, 241, 243, 245, or 251.

Terminal course covering the fundamental aspects of aliphatic and aromatic chemistry.

**241 U 3****Organic Chemistry**

A, W, Sp. 3 cl.

Prereq.: 123.

Not open to students with credit for 231, 235, or 251.

The first half of a two-quarter course in fundamental organic chemistry designed for non-majors in chemistry or in preparation for high school teaching.

**242 U 3****Organic Chemistry**

Su, W, Sp. 3 cl.

Prereq.: 241.

Not open to students with credit for 232, 235, or 252.

Continuation of 241.

**243 U 3****Organic Chemistry Laboratory**

Su, A, W, Sp. 9 lab. hrs.

Prereq. or concur.: 241.

Not open to students with credit for 231, 235, 245, or 254.

A preparation of a series of typical organic compounds, such as are studied in 241-242, their purification, and a study of their properties.

**244 U 3****Organic Chemistry Laboratory**

Su, W, Sp. 9 lab. hrs.

Prereq.: 243; prereq. or concur. 242.

Not open to students with credit for 232, 235, 246, or 255.

Continuation of 243.

**245 U 2****Organic Chemistry Laboratory**

A, W, Sp. 6 lab. hrs.

Prereq. or concur.: 241.

Not open to students with credit for 231, 235, 243, or 254.

A preparation of a series of typical compounds, such as those studied in 241 and 242, and a study of their properties.

**246 U 2****Organic Chemistry Laboratory**

Su, W, Sp. 6 lab. hrs.

Prereq.: 245; prereq. or concur. 242.

Not open to students with credit for 232, 235, 244, or 255.

Continuation of 245.

**251 U 3****Organic Chemistry**

A. 3 cl.

Prereq.: 123.

Not open to students with credit for 231 or 241.

A fundamental course in chemistry designed for chemistry majors and chemical engineers.

**252 U 3****Organic Chemistry**

W. 3 cl.

Prereq.: 251.

Not open to students with credit for 232 or 242.

Continuation of 251.

**253 U 3****Organic Chemistry**

Sp. 3 cl.

Prereq.: 252.

Continuation of 252.

**254 U 3****Organic Chemistry Laboratory**

W. 6 or 9 lab. hrs.

H254 (honors) may be available to students enrolled in a college honors program; others with permission of dept.

Prereq. or concur.: 251.

Not open to students with credit for 243-244.

The preparation, purification, characterization, and study of the properties of typical organic compounds. Fee.

**255 U 3****Organic Chemistry Laboratory**

Sp. 6 or 9 lab. hrs.

H255 (honors) may be available to students enrolled in a college honors program; others with permission of dept.

Prereq.: 254 or concur. 252.

Continuation of 254.

**294 U 3-5****Group Studies**

A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

Designed to give students an opportunity to pursue special studies in chemistry.

**501 U G 5****Recent Advances in Chemistry**

Su, A. 5 cl.

Prereq.: Academic Year Science Institute students only; 30 cr. hrs. of Chem.

Not for graduate credit to students majoring in Chem.

Designed for high school science teachers; recent developments in the theory of valence, particle nature of matter, colloids, high polymers, nuclear chemistry, fuels and photosynthesis.

**502 U G 3****Radiochemistry**

Su. Summer Institute only. 4 cl. each week.

Prereq.: Academic Year Science Institute students only; 1 yr. college Math., 1 yr. college Chem., and 1 yr. college Physics.

Not for credit to students majoring in Chem.

The properties of the nucleus, selection, and preparation of isotopes for tracer work, the application of radioactive isotopes to chemical problems.

**521 U G 5****Physical Chemistry**

Sp. 5 cl.

Prereq.: 242-244 or 252-255, or equiv., Math. 151, and Physics 113.

Not for graduate credit to students majoring in Chem.

A study of the fundamental principles of physical chemistry arranged for students in the biological sciences.

**531 U G 3****Physical Chemistry**

A. 3 cl.

H531 (honors) may be available to students enrolled in a college honors program; others with permission of dept.

Prereq.: 212 or 221 or equiv., Physics 113 or 133 and Math. 254; prereq. or concur. Math. 255; concur. 551 recommended for Chem. majors.

Not for graduate credit to students majoring in Chem.

The fundamental course in physical chemistry.

**532 U G 3****Physical Chemistry**

W. 3 cl.

H532 (honors) may be available to student enrolled in a college honors program; others with permission of dept.

Prereq.: 531; concur. 552 recommended for Chem. majors.

Not for graduate credit to students majoring in Chem.

Continuation of 531.

**533 U G 3****Physical Chemistry**

Sp. 3 cl.

H533 (honors) may be available to students enrolled in a college Honors Program; others with permission of dept.

Prereq.: 532.

Not for graduate credit to students majoring in Chem.

Continuation of 532.

**541 U G 3****Physical Chemistry Laboratory**

A, Sp. 1 cl., 8 lab. hrs.

Prereq. or concur.: Chem E. 3rd yr. standing, 521 or 533 or equiv.

**551 U G 2****Physical Chemistry Laboratory**

A, W, Sp. 6 lab. hrs.

Prereq. or concur.: 531.

Quantitative measurements of phenomena of chemical interest and the application of chemical principles to their interpretation.

**552 U G 2****Physical Chemistry Laboratory**

A, W, Sp. 6 lab. hrs.

Prereq.: 551; prereq. or concur. 532.

Continuation of 551.

**587 U G 5****Principles of Instrumental Analysis**

Sp. 3 cl., 6 lab. hrs.

Prereq.: 532, 552, and prereq. or concur. 533.

Application of physical-chemical principles to problems of chemical analysis; laboratory practice in basic instrumental techniques.

**594 U G 3****Group Studies**

A, W, Sp. 3 cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 9 cr. hrs.

Designed to give students an opportunity to pursue special studies in chemistry.

**601 U G 1****Chemical Information Science**

A. 1 cl.

Prereq.: 212 or 242 or 255, or equiv.

Chemical library usage for information retrieval and introduction to modern methods of chemical information handling.

**602 U G 2****History of Chemistry**

W. 2 cl.

Prereq.: 212 or 242 or 255, or equiv.

A general course in the history of chemistry with special reference to the development of the theories of the science.

**616 U G 4****Organic and Inorganic Micro Quantitative Analysis**

Sp. 1 cl., 9 lab. hrs.

Prereq.: 221, 242-244, or 252-255, or equiv.

Application of various micro chemical techniques for solving problems in organic and inorganic chemistry.

**621 U G 4****Chemical Spectrophotometry**

W. 2 cl., 6 lab. hrs.

Prereq. or concur.: 531.

Application of infrared, visible, ultraviolet spectrophotometers, atomic emission and absorption spectrographs to problems involving inorganic and organic molecular structure, analysis, equilibria, and reaction rates.



**631 U G 3****Structure Determination and Identification of Organic Compounds**

A. 1 hr. lec., 9 lab. hrs.

Prereq.: 253 or equiv.

Application of chemical and physical methods in structure determination of organic compounds.

**632 U G 3****Physical Methods in Organic Chemistry**

Sp. 3 cl.

Prereq.: 253 and 533 or equiv.

Selected topics in bonding, molecular orientation, and reactivity of organic compounds and metastable intermediates with emphasis on physical methods of approach.

**635\* U G 3****Chemistry of the Carbohydrates**

A. 3 cl.

Prereq.: 242 or 252 or equiv.

Repeatable to a maximum of 6 cr. hrs., with permission of instructor.

(a) Monosaccharides

(b) Oligosaccharides and polysaccharides

(a) is given in even-numbered years and (b) in odd-numbered years.

**651 U G 3****Advanced Inorganic Chemistry I**

Su, A. 3 cl.

Prereq.: 533 or permission of instructor.

An introduction to the concepts and chemical systems of inorganic chemistry, including atomic structure, the periodic table, molecular structure and bonding, ionic crystals, defect solid state and electron deficient compounds.

**652 U G 3****Advanced Inorganic Chemistry II**

W. 3 cl.

Prereq.: 651.

The chemistry of the transition elements; coordination compounds, organometallics, noble gases, representative elements, and lower boron hydrides; acid-base theories.

**653 U G 3****Advanced Inorganic Chemistry III**

Sp. 3 cl.

Prereq.: 652.

A discussion of special topics in modern inorganic chemistry, correlating the group relationships among the non-metallic elements, polyhedral anions and carborane structures.

**655 U G 3****Inorganic Chemistry Laboratory**

Sp. 9 lab. hrs.

Prereq.: 533 or equiv.

Preparative techniques of inorganic chemistry including the use of liquified gases, aqueous and non-aqueous solutions, anhydrous and oxygen-free systems, fusion reactions, etc.

**661****Biochemistry**

Prereq.: 251, 252, 253 or equiv. with grade of A or B; 531, 532, 533 or equiv. with grade of A or B.

A survey of biochemistry for the superior advanced undergraduate or the beginning graduate student who does not necessarily plan to do graduate research in biochemistry.

**661.01 Biochemistry****U G 3**

W. 3 cl.

**661.02 Biochemistry****U G 2**

Sp. 2 cl.

**671 U G 3****Nuclear, Radio, and Radiation Chemistry**

A. 3 cl.

Prereq.: 533 or equiv.

Nuclear properties, nature of radioactivity, radioactive decay and growth, interactions of radiation with matter, applications.

**672 U G 2****Nuclear Chemistry Laboratory**

W. 6 lab. hrs.

Prereq.: 671.

Techniques of handling radioactive tracers, the detection and measurement of different types of radiation, neutron activations, and other related laboratory techniques.

**675 U G 4****X-Rays and Crystal Structure**

A. 3 cl., 3 lab. hrs.

Prereq.: Math. 255, Physics 113 or 132, 133, or equiv.

An introduction to the methods of X-ray crystal analysis; theory of symmetry of crystals and of diffraction will be discussed and applied.

**676 U G 3****Colloid Chemistry**

W. 3 cl.

Prereq.: 533.

Modern theories of colloidal behavior; absorption and surface phenomena; physical-chemical methods for the characterization of proteins, high polymers, and inorganic colloids.

**678 U G 3****Chemistry of the Urban Atmosphere**

Sp. 3 cl.

Prereq.: 532.

Study of the chemistry of urban atmospheres applying kinetic and thermodynamic principles; prediction of the rates and mechanisms of transformation, and the control of atmospheric pollutants.

**693 U G 1-15****Individual Studies**

Su, A, W, Sp. Conf., library, and lab.

Prereq.: Satisfactory courses in field of the problem and permission of instructor.

Repeatable to a maximum of 60 cr. hrs.

A qualified student may conduct a minor investigation in chemistry.

**694 U G 3-5****Group Studies**

A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

Designed for students to pursue advanced special studies in chemistry.

**733 U G 3****The Chemistry of Bio-Organic Catalysts**

W. 3 cl.

Prereq.: 253 or 831; concur. 533.

Structure of organic catalysts and the mechanism of their reactions.

**821 G 3****Advanced Analytical Chemistry**

A. 3 cl.

Prereq.: 533, 631; or permission of instructor.

Advanced level discussion of electrochemical principles and mass transport processes; discussion of applications to organic and inorganic systems.

**822 G 3****Advanced Analytical Chemistry**

W. 3 cl.

Prereq.: 821 or permission of instructor.

Kinetic and thermodynamic processes of fundamental importance in the characterization of chemical species.

**823 G 3****Advanced Analytical Chemistry**

Sp. 3 cl.

Prereq.: 822 or permission of instructor.

Advanced course in the principles of measurement of the interaction of electromagnetic radiation with matter.

**831 G 3****Advanced Organic Chemistry**

A. 3 cl.

831-832-833 to be taken in sequence.

An advanced course in the fundamental principles of chemistry covering the aliphatic hydrocarbons and their derivatives.

**832 G 3****Advanced Organic Chemistry**

W. 3 cl.

Prereq.: 831.

An advanced course in the fundamental principles of chemistry covering alicyclic, hydroaromatic, and aromatic compounds.

**833 G 3****Advanced Organic Chemistry**

Sp. 3 cl.

Prereq.: 832.

An advanced course in the fundamental principles of chemistry covering a survey of heterocyclic compounds, carbohydrates, proteins, and enzymes.

**835 G 3 or 5****Advanced Organic Chemistry Laboratory**

Su, W. 9 lab. hrs.

Prereq.: Permission of student's graduate adviser.

An advanced course in fundamental reactions and procedures with emphasis on recent advances in technique.

**836 G 3 or 5****Advanced Organic Chemistry Laboratory**

Su, Sp. 9 lab. hrs.

Prereq.: Permission of student's graduate adviser.

Continuation of 835.

**851 G 3****Advanced Inorganic Chemistry**

A. 3 cl.

Prereq.: 533, 652, or permission of instructor.

A survey of modern theories of valence and their application to the problems of structural inorganic chemistry.

**852 G 3****Advanced Inorganic Chemistry**

W. 3 cl.

Prereq.: 851 or permission of instructor.

A detailed treatment of the chemistry of the transition elements from the standpoint of molecular and atomic structure, electronic spectra, magnetism, and ligand-field theory.

**855 G 3****Advanced inorganic Chemistry Laboratory**

Su. 1 cl., 8 lab. hrs.

Prereq.: 551; 552; 651 or permission of instructor.

Advanced methods for the synthesis, purification, identification, and characterization of inorganic substances.

**861 G 3****Quantum Chemistry I**

A. 3 cl.

Prereq.: 533, Physics 133, Math. 255 or 415 or equiv.

Not open to students with credit for 971.

Basic quantum mechanics as a foundation for quantum chemistry; postulates, operators, eigenfunctions, eigenvalues, and Schrodinger wave equations; one-dimensional problems including the harmonic oscillator.

**862 G 3****Quantum Chemistry II**

W. 3 cl.

Prereq.: 861 or equiv.

Not open to students with credit for 972.

Angular momentum; matrix elements and representations; the hydrogenic atom; perturbation and variation methods, electron spin, and the helium atom; atomic structure and multiplet theory.

**863 G 3****Quantum Chemistry III**

Sp. 3 cl.

Prereq.: 862.

Not open to students with credit for 973.

Electronic structure of molecules; hydrogen molecule and ion, methane, ethylene, benzene, etc.; molecular orbital, valence bond, and self-consistent field methods.

**871 G 3****Research Instrumentation**

Sp. 9 lab. hrs.

Prereq.: 533; Physics 132, 133, Math. 255 or equiv.

Background theory and laboratory applications in the use of electrical and electronic instruments in chemical research.

**872 G 3****High Polymers**

Su, Sp.

Prereq.: 533.

A course in the physical chemistry of macromolecules and their solutions, including the kinetics of polymerization reactions.

**873 G 3****X-Rays and Electron Diffraction**

W. 3 cl.

Prereq.: 675.

An advanced consideration of the theory of X-rays and electron diffraction and their applications including Fourier methods of parameter determination in crystals, etc.

**875 G 3****Chemical Kinetics I**

A. 3 cl.

Prereq.: 533.

Fundamentals of chemical kinetics in homogeneous liquid and gaseous systems.

**876 G 3****Chemical Kinetics II**

W. 3 cl.

Prereq.: 875.

Continuation of 875; elementary reactions; chain reactions; fast reaction methods; reaction rates in heterogeneous systems.

**877 G 3****Radiation and Photochemical Kinetics**

Sp. 3 cl.

Prereq.: 875.

The physical and chemical effects of the absorption of radiant energy, with emphasis on kinetics and mechanism.

**881 G 3****Thermodynamics**

W. 3 cl.

Prereq.: 875 or equiv.

Introduction to thermodynamics; emphasis on training in the use of thermodynamics as a tool for solving chemical problems.

**882 G 3****Statistical Thermodynamics**

Sp. 3 cl.

Prereq.: 881.

An introduction to statistical thermodynamics, including quantum statistics, entropy and the third law, statistical-spectroscopic calculation of thermodynamic functions of gases, chemical equilibria, and vapor pressure.

**885 G 1****Colloquium in Chemistry**

A, W, Sp. 1 cl.

Prereq.: Graduate standing in Chem.

Required every qtr. of all registered graduate students in Chem.

A discussion of current research in chemistry; all divisions.

**941 G 3****Theoretical Organic Chemistry**

A. 3 cl.

Prereq.: 2nd yr. graduate standing, 831-832 or permission of instructor.

An advanced course in a special topic in organic chemistry; topic to be announced.

**942 G 3****Theoretical Organic Chemistry**

W. 3 cl.

Prereq.: 2nd yr. graduate standing, 831-832, or permission of instructor.

An advanced course in a special topic in organic chemistry; topic to be announced.

**943 G 3****Theoretical Organic Chemistry**

Sp. 3 cl.

Prereq.: 2nd yr. graduate standing, 831-832, or permission of instructor.

An advanced course in a special topic in organic chemistry; topic to be announced.

**970 G 3****Advanced Thermodynamics**

A. 3 cl.

Prereq.: 881.

Continuation of 881 and 882.

**981 G 3****Electronic Structure and Spectra of Molecules**

W. 3 cl.

Prereq.: 863 or equiv.

An extension of molecular orbital and valence bond theory to larger molecules than those considered in Chemistry 863.

**990 G 3****Seminar on Topics in Biochemistry**

Su, A, W, Sp. 3 cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 12 cr. hrs.

Advanced topics in the biological aspects of chemistry.

**991 G 3****Seminar in Analytical Chemistry**

A. 3 cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 9 cr. hrs.

Topic to be announced.

**992 G 3****Seminar in Organic Chemistry**

A, W, Sp. 3 cl.

Prereq.: Chem. 2nd yr. grad. standing and 831, 832 or equiv. and permission of instructor.

Repeatable to a maximum of 12 cr. hrs.

Topic to be announced.

**994 G 3-4****Group Studies**

A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 8 cr. hrs.

Provides an opportunity for innovation and experimentation on new problems in chemistry.

**995 G 2 or 3****Seminar in Inorganic Chemistry**

A. 2 cl.

Prereq.: 651 and 652 or equiv. and permission of instructor.

Repeatable to a maximum of 9 cr. hrs.

Topic to be announced.

**996 G 3****Seminar in Theoretical Chemistry**

Su, A, W, Sp. 3 cl.

Prereq.: 861, 862, 863; or equiv.

Repeatable to a maximum of 9 cr. hrs.

Advanced topics in theoretical chemistry including quantum mechanics of molecular wave functions, energies, and rate processes, and quantum and statistical mechanics of condensed phases.

**997 G 3****Seminar in Physical Chemistry**

Su, A, W, Sp. 3 cl.

Prereq.: At least a 2nd yr. grad. standing in Physical Chem.

Repeatable to a maximum of 9 cr. hrs. with permission of instructor.

Topic to be announced.

**999 G Arr.****Research in Chemistry**

Su, A, W, Sp.

Research for thesis or dissertation purposes only.

## Chinese

Office: 276 Dieter Cunz Hall of Languages, 1841 Millikin Road

Professors Li (Chairman) and E. Ching; Associate Professors Chang, Ch'en, Hsueh, and Lao; Assistant Professor Chan; Instructors N. Ching and Lee.

**101 U 5****Elementary Modern Chinese**

A. 5 cl.

Basic elements of Modern Chinese (Mandarin); the four tones, sentence structures, and Chinese characters (of which 600 will be learned in three quarters). N. Ching.

**102 U 5****Elementary Modern Chinese**

W. 5 cl.

Prereq.: 101.

Continuation of 101. N. Ching.

**103 U 5****Elementary Modern Chinese**

Sp. 5 cl.

Prereq.: 102 or 110.

Continuation of 102. N. Ching.

**104 U 5****Intermediate Modern Chinese**

W. 5 cl.

Prereq.: 103 or permission of instructor.

Four hundred additional characters, further combination of characters in three quarters; complex sentence structure; readings adapted from modern Chinese literature. Lee.

**105 U 5****Intermediate Modern Chinese**

W. 5 cl.

Prereq.: 104 or permission of instructor.

Not open to students with credit for 405.

Continuation of 104. Lee.

**106 U 5****Intermediate Modern Chinese**

Sp. 5 cl.

Prereq.: 105 or permission of instructor.

Not open to students with credit for 406.

Continuation of 105. Lee.

**110 U 5 or 10****Intensive Chinese**

A. 10 cl.

Prereq.: Permission of dept.

Students with credit for 101 or the equiv. may not register for more than 5 cr. hrs.; not open to students with credit for 102.

Accelerated course covering what is done in 101-102; for students desiring two quarters of language work in one quarter. E. Ching and Staff.

**111 U 5 or 10****Intensive Chinese**

W. 10 cl.

Prereq.: 102, 110, or permission of instructor.

Students with credit for 103 or the equiv. may not register for more than 5 cr. hrs.; not open to students with credit for 104.

Accelerated course covering what is done in 103-104; for students desiring two quarters of language work in one quarter. E. Ching and Staff.

**112 U 5, 10, 15****Intensive Chinese**

Su. 15 cl.

Prereq.: Permission of dept.

Full time of student and full fees required.

Students with credit for 101 or the equiv. may not register for more than 10 cr. hrs. Students with credit for 101 and 102 or equiv. may not register for more than 5 cr. hrs. Not open to students with credit for 103 or 111. No audit.

Elementary modern Chinese (Mandarin) for students desiring comprehensive knowledge and skills of Chinese in shortest possible time.

**113 U 5 or 10**

**Intensive Chinese**

Sp. 10 cl.

Prereq.: 104, 111, or permission of instructor.

Students with credit for 105 or the equiv. may not register for more than 5 cr. hrs.; not open to students with credit for 106.

Accelerated course covering what is done in 105-106; for students desiring two quarters of language work in one quarter. E. Ching and Staff.

**114 U 3**

**Elementary Chinese Conversation and Composition**

Sp. 3 cl.

Prereq.: 102, 110, or permission of instructor.

Oral drills and sentence-making exercises based upon the vocabulary and sentence patterns acquired in 101 and 102, and concurrently in 103; conducted predominantly in Chinese. E. Ching and Staff.

**214 U 3**

**Intermediate Chinese Conversation and Composition**

Sp. 3 cl.

Prereq.: 105 and 114, or permission of instructor.

Exercises in conversation and composition based upon materials used in 104 and 105, and concurrently in 106; conducted predominantly in Chinese. E. Ching and Staff.

**231 U 5**

**Elements of Chinese Culture**

A. 5 cl.

Taught in English.

Not open to students with credit for 271.

Survey of the major philosophical trends of Confucianism and Taoism in China; discussion of Chinese mythology, religion, art, and literature. Lao.

**251 U 3**

**Chinese Literature in Translation: Early Period**

W. 3 cl.

Historical, philosophical, and poetical classics of China. Chan.

**252 U 3**

**Chinese Literature in Translation: Middle and Modern Periods**

Sp. 3 cl.

Masterpieces of late classical poetry and the vernacular novel; representative works of modern fiction, poetry, and drama. Chan.

**501 U 5**

**Classical Chinese I**

A. 5 cl.

Prereq.: 106 or permission of instructor.

Not open to students with credit for 601 or 651.

Selected readings from representative authors of classical times. Chan.

**502 U 5**

**Classical Chinese II**

W. 5 cl.

Prereq.: 501 or permission of instructor.

Not open to students with credit for 602 or 652.

Continuation of 501. Chan.

**503 U 5**

**Classical Chinese III**

Sp. 5 cl.

Prereq.: 502 or permission of instructor.

Not open to students with credit for 603 or 653.

Continuation of 502. Chan.

**507 U G 5**

**Advanced Modern Chinese I**

A. 5 cl.

Prereq.: 106 or permission of instructor.

Not open to students with credit for 609.

Reading of contemporary prose and verse, presentation of oral and written reports, drill in tone and intonation, practice in translation. Hsueh and Staff.

**508 U G 5**

**Advanced Modern Chinese II**

W. 5 cl.

Prereq.: 507 or permission of instructor.

Not open to students with credit for 610.

Continuation of 507. Hsueh and Staff.

**509 U G 5**

**Advanced Modern Chinese III**

Sp. 5 cl.

Prereq.: 508 or permission of instructor.

Not open to students with credit for 611.

Continuation of 508. Hsueh and Staff.

**514 U 3**

**Advanced Chinese Conversation and Composition**

Sp. 3 cl.

Prereq.: 214 and 508, or permission of instructor.

Practice of conversation, discussion, oral report, and short speech at an advanced level; use of various taped materials; theme-writing exercises; conducted entirely in Chinese. E. Ching and staff.

**641 U G 3**

**History of Chinese Thought**

Sp. 3 cl.

Prereq.: 231 or permission of instructor.

Not open to students with credit for 671.

Detailed examination of the major Chinese philosophies; readings from selected Chinese texts. Chang.

**654 U G 3**

**History of Chinese Literature I**

A. 2 cl.

Prereq.: 503 and 509, or permission of instructor.

Not open to students with credit for 604.

Chinese literature from the earliest times to the end of Han (early 3rd century); investigation of various aspects of the classical tradition. Li.

**655 U G 3****History of Chinese Literature II**

W. 2 cl.

Prereq.: 503 and 509, or permission of instructor.

Not open to students with credit for 605.

Chinese literature from Wei (3rd century) to the end of Sung (12th century); literary trends and achievements of the Six Dynasties and the T'ang-Sung period. Ch'en

**656 U G 3****History of Chinese Literature III**

Sp. 2 cl.

Prereq.: 503 and 509, or permission of instructor.

Not open to students with credit for 606.

Chinese literature from Yuan (13th century) to the present; rise of drama and the novel; modern writers from the Literary Revolution on. Li.

**680 U G 3****Introduction to Chinese Linguistics**

A. 3 cl.

Prereq.: 103 and Ling. 601, or permission of instructor.

A general investigation of the history, phonology, morphology, syntax, and lexicon of the Chinese language. Hsueh.

**681\* U G 3****History of The Chinese Language**

W. 3 cl.

Prereq.: 103 and Ling. 601, or permission of instructor.

Not open to students with credit for 627.

An investigation of the relations between modern Chinese and its earlier stages, ancient and archaic Chinese. Hsueh.

**683 U G 3****Study of the Chinese Writing System**

A. 3 cl.

Prereq.: 103 or permission of instructor.

Not open to students with credit for 620 or 684.

A critical study of the origin, classification, composition, and development of the Chinese writing system, including problems in simplification and alphabetization. Ching.

**690 U G 3****Chinese Translation Workshop**

Sp. 2 cl.

Prereq.: 503 and 509, or permission of instructor.

Investigation of problems and techniques of translating Chinese into English and English into Chinese: practice of translation of selected passages; individual assignments and group discussion.

**693 U G 1-5****Individual Studies**

Su, A, W, Sp.

Prereq.: 503 and 509, and permission of chairman.

Repeatable to a maximum of 15 cr. hrs.

Directed study to meet individual research needs of students in area studies and East Asian programs; not a substitute for regular language courses.

**694 U G 1-5****Group Studies**

Su, A, W, Sp.

Prereq.: 503 and 509, or permission of chairman.

Repeatable to a maximum of 15 cr. hrs.

Investigation of minor problems in Chinese language and literature; not a substitute for regular language courses.

**698\* U G 15****Study Tour of Taiwan**

Sp. 15 cl., 2 wks. at OSU, 8 wks. in Taiwan.

Prereq.: 25 cr. hrs. of Chin. or permission of instructor.

Advanced work in conversation and reading in order to prepare for the tour; in Taiwan only Chinese will be spoken; some formal instruction given daily by the tour leaders.

**751 U G 3****Selected Readings in Scholarly Chinese Texts I**

A. 3 cl.

Prereq.: 509 or permission of instructor.

Academic writings in the humanities and social sciences by modern Chinese scholars in both the wen-yen and pai-hua styles. Lao.

**752 U G 3****Selected Readings in Scholarly Chinese Texts II**

W. 3 cl.

Prereq.: 751 or permission of instructor.

Continuation of 751. Lao.

**753 U G 3****Selected Readings in Scholarly Chinese Texts III**

Sp. 3 cl.

Prereq.: 752 or permission of instructor.

Continuation of 752. Lao.

**761\* U G 3****Modern Chinese Poetry**

A. 3 cl.

Prereq.: 656 or permission of instructor.

Not open to students with credit for 704.

Lectures and readings covering major poets since 1919. Ch'en.

**762†\* U G 3****Modern Chinese Prose**

W. 3 cl.

Prereq.: 656 or permission of instructor.

Not open to students with credit for 705.

Studies of various types of prose literature of the May Fourth Movement and the Communist period. Lao.

**763\* U G 3****Modern Chinese Fiction**

W. 3 cl.

Prereq.: 656 or permission of instructor.

Not open to students with credit for 706.

Works by major authors before and after 1949.

Li.

**764\* U G 3****Modern Chinese Drama**

Sp. 3 cl.

Prereq.: 654 and 655, or permission of instructor.

Lectures on and readings in works by major 20th century playwrights including Hung Shen and Ts'ao Yu. Ch'en.

**771†\* U G 3****Traditional Chinese Poetry**

A. 3 cl.

Prereq.: 654 and 655, or permission of instructor.

Not open to students with credit for 703.

Lectures and readings from ancient odes and songs and the later *shih* and *tz'u* poetry. Ch'en.**772\* U G 3****Traditional Chinese Prose**

W. 3 cl.

Prereq.: 654 and 655, or permission of instructor.

Lectures on and readings in various types of non-fiction prose in *ku-wen* and *yu-lu-t'i* styles of early times. Lao.**773†\* U G 3****Traditional Chinese Fiction**

W. 3 cl.

Prereq.: 654 and 655, or permission of instructor.

Not open to students with credit for 701.

Lectures and readings in classical and vernacular fiction. Li.

**774†\* U G 3****Traditional Chinese Drama**

Sp. 3 cl.

Prereq.: 654 and 655, or permission of instructor.

Not open to students with credit for 702.

A lecture and reading course in Yuan, Ming, and Ch'ing drama. Ch'en.

**782 U G 3****Chinese Phonology**

Sp. 3 cl.

Prereq.: 680 or 681 or permission of instructor.

Not open to students with credit for 624.

A detailed analysis of the phonological structure of Mandarin Chinese. Hsueh.

**H783† U 3-5****Honors Course**

A, W, Sp.

Prereq.: 4th yr. standing; a record of A in at least half of the Chinese courses taken and an average of B in the remainder; permission of instructor under whose supervision the work is to be completed and the Arts and Sciences Honors Committee.

Failure to receive a mark of S in this course is a disqualification for special honors.

Open only to candidates for B.A. in Chinese.

A program of reading arranged for each student, with individual conferences, reports and Honor thesis.

**784 U G 3****Chinese Syntax**

Sp. 3 cl.

Prereq.: 680 or 681 or permission of instructor.

Not open to students with credit for 626.

An investigation of the syntactic structure of Mandarin Chinese. Ching.

**785†\* U G 3****Chinese Dialectology**

W. 3 cl.

Prereq.: 680 or permission of instructor.

A comparative study of Chinese dialects and a detailed analysis of one or two particular dialects.

**800 G 3****Chinese Bibliography and Research Methods**

Sp. 3 cl.

Prereq.: 503 and 509 or permission of instructor.

Not open to students with credit for 707.

An introduction to bibliographies and reference works; general and specific problems for research. Lao.

**804 G 3****Advanced Classical Chinese I**

A. 3 cl.

Prereq.: 503 or permission of instructor.

Designed for further study of the syntax and vocabulary of classical Chinese; texts are selected from literature, history, and philosophy. Hsueh.

**805 G 3****Advanced Classical Chinese II**

W. 3 cl.

Prereq.: 804.

Continuation of 805. Hsueh.

**806 G 3****Advanced Classical Chinese III**

Sp. 3 cl.

Prereq.: 805.

Continuation of 805. Hsueh.

**867\* G 3-5****Topics and Problems in Modern Chinese Literature**

A, W, Sp. Arr.

Prereq.: Permission of instructor.

Intensive exploration of a specific topic or a major problem.

**869 G 3-5****Seminar in Modern Chinese Literature**

Su, A, W, Sp. Arr.

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

An intensive reading course in modern Chinese literature with a selected topic for each offering and research projects for individual students; topic to be announced.

**875\* G 5****Chinese Literary Criticism**

W. 2 cl.

Prereq.: 3 Chin. literature courses at the 700 level or permission of instructor.

The historical development of critical theories, with concentration on major critics. Ch'en.

**876†\* G 5****Chinese Poetics**

W. 2 cl.

Prereq.: 761 and 771, or permission of instructor.

An intensive study of Chinese poetic theories, traditional and modern, in relation to the creative process; consideration of several non-Chinese theories of poetry. Ch'en.

**877†\* G 3-5****Topics and Problems  
in Traditional Chinese Literature**

A, W, Sp. Arr.

Prereq.: Permission of instructor.

Intensive exploration of a specific topic or a major problem.

**879 G 3-5****Seminar in Traditional Chinese Literature**

Su, A, W, Sp. Arr.

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

An intensive reading course in traditional Chinese literature with a selected topic for each offering and research projects for individual students; topic to be announced.

**882†\* G 3****Studies in Chinese Historical Phonology**

Sp. 3 cl.

Prereq.: 782 or permission of instructor.

Critical study of the rhyming dictionaries, the reconstruction of the phonology of old Chinese and its relations to modern Chinese dialects. Hsueh.

**883\* G 3****Chinese Paleography**

W. 3 cl.

Prereq.: 683 or permission of instructor.

Study of oracle bone and bronze inscriptions and their development into the modern Chinese writing system. Ching.

**884†\* G 3****Studies in Chinese Historical Syntax**

W. 3 cl.

Prereq.: 784 or permission of instructor.

Problems of Chinese historical syntax; grammatical structures of classical Chinese; syntactic rules found in selected texts from various ancient writings. Ching.

**889 G 3-5****Seminar in Chinese Linguistics**

A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Topics include the history of Chinese linguistics, Chinese linguistics and related areas, specific studies in Chinese dialects, etc.

**999 G Arr.****Research in Chinese: Thesis**

Su, A, W, Sp.

Research for thesis purposes only.

**999 G Arr.****Research in Chinese: Dissertation**

Su, A, W, Sp.

Research for dissertation purposes only.

## Circulation Technology

(School of Allied Medical Professions)

Office: 443 School of Allied Medical Professions Building, 1583 Perry Street

Associate Professor Vasko (Division Director);  
Instructors Dearing (Associate Division Director)  
Jurrus, and Toth.**400 U 5****The Aseptic Environment**

W. 2 cl., 2 3-hr. lab.

Prereq.: Permission of instructor.

An introduction to the aseptic environment with emphasis on the student's function within this environment as a member of the medical-surgical team. Dearing and Staff.

**410 U 8****Applied Circulation Technology**

Sp. 5 cl., 2 4-hr. lab., 2 2-hr. conf.

Prereq.: Permission of instructor.

The application of anatomic and physiological principles in the use of various perfusion devices. Dearing and Staff.

**420 U 5****Circulation Technology Instrumentation**

Sp. 3 cl., 2 2-hr. lab.

Prereq.: Permission of instructor.

The application of mechanical and electronic principles to the instrumentation unique to circulation technology with emphasis on design and selection of equipment. Toth.

**550 U 7****Research Methodology**

A, W, Sp. 5 2-hr. cl.

Prereq.: 410 and 420, or permission of instructor; concur. 551.

Lectures and demonstrations relating circulation technology to research methodology with emphasis on new developments in this area. Toth.



551 U 8

**Research Methodology Laboratory**

A, W, Sp. 5 4-hr. clinical experiences.

Prereq.: 410 and 420, or permission of instructor; concur. 550.

Application of circulation technology methods to the solution of research problems. Toth.

560 U 7

**Life Support Systems**

Su, A, W, Sp. 5 2-hr. cl.

Prereq.: 410 and 420, or permission of instructor; concur. 561.

Lectures and demonstrations relating circulation technology to various life support systems including dialysis and hyperbaric oxygenation. Dearing and Staff.

561 U 8

**Life Support Systems Clinical Experience**

Su, A, W, Sp. 20 hrs. clinical experience per wk.

Prereq.: 410 and 420, or permission of instructor; concur. 560.

Clinical experience in the application of circulation technology methods to dialysis and other support systems. Dearing and Staff.

570 U 7

**Surgical Support Systems**

Su, A, W, Sp. 5 2-hr. cl.

Prereq.: 410 and 420, or permission of instructor; concur. 571.

Lectures and demonstrations relating circulation technology to the clinical use of extracorporeal circulation devices and monitoring instrumentation in surgery. Dearing and Staff.

571 U 8

**Surgical Support Systems Clinical Experience**

Su, A, W, Sp. 20 hrs. clinical experience per wk.

Prereq.: 410 and 420, or permission of instructor; concur. 570.

Clinical experience in the preparation and operation of extracorporeal circulation devices and monitoring instrumentation in support of surgery. Dearing and Staff.

701 U G 3

**Introduction to Urban Planning Practice**

A. 3 cl.

Review of urban planning as practiced by local governments today, including plan-making and plan-implementation phases.

731 U G 3

**Outlines of Urban Design**

Sp. 3 cl.

Prereq.: Grad. standing in C &amp; R Plan. or Arch., or senior standing in Arch. or Land. Arch., or permission of instructor.

Urban design as an area of specialization in urban planning; theories and processes in urban design; evaluation of criteria. Marzeki.

742 U G 3

**History of City Planning to 1900**

W. 2 cl.

History of city planning from the earliest discovered settlements to the beginning of contemporary planning. Gerckens.

743 U G 4

**American City Planning Since 1900**

Su, A, Sp. 3 cl.

Prereq.: 3rd yr. standing or permission of instructor.

Not open to students with credit for C &amp; R Plan. 300 or 811.

Evolution of American city planning practices since 1900; investigation of selected theoretical works in urban planning written since 1960. Gerckens.

751 U G 5

**Metropolitan Transportation Studies for Urban Planners**

A. 4 cl.

Prereq.: Grad. standing or permission of instructor.

Methods and models used in metropolitan transportation studies with emphasis on land-use forecasting, evaluation of alternative plans, and citizen reaction. Mills.

793 U G 1-5

**Individual Studies in Urban Planning**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Each subdivision repeatable to a maximum of 20 cr. hrs.

793.13 Urban Planning Theory

793.14 Urban Planning Analysis

793.15 Urban Planning Design

793.16 Urban Planning Implementation Programs

793.17 Unclassified

794 U G 1-5

**Group Studies in Urban Planning**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Each subdivision repeatable to a maximum of 20 cr. hrs.

794.13 Urban Planning Theory

794.14 Urban Planning Analysis

794.15 Urban Planning Design

794.16 Urban Planning Implementation Programs

794.17 Unclassified

## City and Regional Planning

Office: 279 Brown Hall, 190 West 17th Avenue

**Professors** Voss (Chairman), Gerckens (Director, School of Architecture), and Rosner; **Adjunct Professor** Simmons; **Associate Professors** Anderson and Mills; **Assistant Professors** Fisch and Hanson.

300 U 3

**Outlines of City Planning**

A, Sp. 2 cl.

Not open to students with credit for Arch. (709).

Introduction to American city planning processes; development of urban problems and related urban planning systems since 1900. Gerckens.

**812 G 3****Theory of City and Regional Planning**

A, 3 cl.

Prereq.: Grad. standing in C &amp; R Plan.

Planning processes; the general plan; formulating goals; land development policies and decisions; alternative urban and regional forms; role and scope of planning.

**813 G 3****Outlines of Regional Planning**

Sp, 3 cl.

Prereq.: Grad. standing in C &amp; R Plan., or in a Conserv. program, or 300, 743 or 811.

State, national, and regional planning; components of regional development; regional analysis and design.

**832 G 5****Urban Planning Data and Forecasting**

Su, W, 3 cl., 6 lab. hrs.

Prereq.: Grad. standing in City Plan.

Sources of information, data handling, forecasting, and basic studies used in urban planning. Mills.

**833 G 3****Consequence Analysis in Urban Planning**

Sp, 2 cl., 2 lab. hrs.

Prereq.: Grad. standing in C &amp; R Plan., or permission of instructor.

Urban planning studies using cost-benefit, cost-effectiveness, systems analysis, and PPBS approaches. Mills.

**845 G 5****Physical Elements of Urban Development**

A, Sp, 3 cl., 3 lab. hrs.

Prereq.: Grad. standing in C &amp; R Plan.

Physical components of urban areas; residential, commercial, industrial, pedestrian, and vehicular circulation; other community facilities; analysis of design criteria and standards.

**851 G 5****Urban Precinct Planning**

W, 3 cl., 6 lab. hrs.

Prereq.: 832 and 845.

Preparation of detailed physical development plans for a small section of a city.

**852 G 5****Urban Project and Policy Planning**

A, Sp, 2 cl., 9 lab. hrs.

Prereq.: 832 and 845.

Identification of options among planning policies and projects; development of analyses to aid in making choices between options in urban development. Mills.

**853 G 5****The Urban General Plan**

Su, W, 3 cl., 6 lab. hrs.

Prereq.: 832, 845, 851, 862.

Current practice in preparation of the urban general plan; laboratory exercise in the preparation of a general plan for an urban community. Anderson.

**861 G 4****Land-Use Controls**

Sp, 3 cl.

Prereq.: Grad. standing in C &amp; R Plan.

Legal basis of land-use controls in the United States, provisions, procedures and issues in zoning, subdivision regulation, urban renewal, building and housing codes, and acquisition of real property for public use. Simmons.

**862 G 5****City Planning Administration**

A, Sp, 4 cl.

Prereq.: Grad. standing in City Plan.

Administration of official urban planning agencies; zoning administration; subdivision review practices; capital improvement programming; budget and work program preparation. Anderson.

**863 G 3****Urban Issues and the Professional Planner**

Sp, 3 cl.

Prereq.: Grad. standing in C &amp; R Plan.

Examination of alternative conceptions of the urban problems of American society; implications of each conception for the urban planning profession. Voss.

**864 G 3****Urban Planning Theory Seminar**

Su, W, 4 cl.

Prereq.: 761, 851, 852, and 862.

Review of contemporary urban planning programs; analyses of objectives and strategies. Voss.

**899 G 1-5****Interdepartmental Seminar**

Su, A, W, Sp.

(See under Interdepartmental Seminars.)

**990 G 1-5****Urban Planning Practicum**

Su, A, W, Sp.

Prereq.: Grad. standing in C &amp; R Plan.

Repeatable to a maximum of 5 cr. hrs.

Supervised field experience in urban planning; analysis and critique of field experience.

**999 G Arr.****Research in City and Regional Planning**

Su, A, W, Sp.

Research for thesis purposes only.

## Civil Engineering

Office: N470 Hitchcock Hall, 2070 Neil Avenue

**Professors** Jones (Chairman), Chen, Gray, Karrer, Large (Emeritus), Majidzadeh, Moulton, Ojalvo, Smith, Treiterer, Vandegriff (Emeritus), Washington, Whitehurst, and Wu; **Associate Professors** Bishara, Bletzacker, Hawnn, Mintzer, Moore, Purtz, Ricca, Rubin, Sandhu, Shumate, and Stiefel; **Assistant Professors** Godfrey, Hughes, Nemeth, Sykes, and Whitlatch; **Adjunct Assistant Professor** Hooper.

### 202 U 4 Elements of Surveying

A, W. 3 cl., 1 3-hr. lab.

Prereq.: Physics 131.

Theory and practice of measurements. Purtz.

### 402 U 4 Photogrammetry

W. 3 cl., 1 3-hr. lab.

Prereq.: 202 or 401.

Fundamental geometry and photogrammetric applications to engineering. Mintzer.

### 404 U 3 City Surveying

Sp. 2 cl., 1 3-hr. lab.

Prereq.: 403.

City control surveys, coordinates of lot and block corners; measurement of details, computation of areas; setting out city plans.

### 405 U 4 Observational Analysis

W, Sp. 4 cl.

Prereq.: 202 and Math. 254.

Theory and application of observational analysis. Purtz.

### 406 U 4 Fundamentals of Civil Engineering Analysis

A, Sp. 4 cl.

Prereq.: 405, Math. 254, and Engr. Gr. 200.

Application of numerical methods to problems in civil engineering. Sandhu.

### 410 U 3 Environmental Pollution Control

W. 3 cl.

Prereq.: Chem. 101 or equiv.

Not open to students majoring in Civil E.

A study of the human environment from a health engineering point of view, with emphasis on those facets of the health picture that are controllable by engineering developments. Rubin.

### 413 U 4 Fluid Mechanics

A, Sp. 3 cl., 1 2-hr. lab.

Prereq.: Engr. Mech. 410.

Not open to students with credit for 514.

Fluid properties; fluid statics; flow concepts; continuity, energy, and momentum equations; dimensional analysis and dynamic similarity; viscous effects; drag; basic pipe flow; laboratory demonstrations. Ricca and Stiefel.

### 431 U 4 Structural Engineering Principles

A, W. 4 cl.

Prereq.: Engr. Mech. 420.

Design planning, structural forms, analysis of statically determinate structures, approximate analysis of statically indeterminate structures.

### 451 U 4 Civil Engineering Materials

A, Sp. 3 cl., 1 3-hr. lab.

Prereq.: Engr. Mech. 210; prereq. or concur. Engr. Mech. 420.

Composition and structure of civil engineering materials; elastic, plastic and viscous behavior under various environmental and loading conditions. Majidzadeh.

### 470 U 4 Transportation Engineering

A, W. 3 cl., 1 3-hr. lab.

Prereq.: 202, Engr. Gr. 200 or equiv., and Engr. Mech. 410.

Elements of transportation systems including physical controls and criteria.

### 504 U G 4 Route Geometrics and Design

Sp. 3 cl., 1 3-hr. lab.

Prereq.: 470.

Horizontal and vertical alignment, sight distances, superelevation, earthwork, construction surveys. Purtz.

### 510\* U G 3 Principles of Hydraulics

A. 3 cl.

Prereq.: Math. 151 and Jhysics 111 or 131.

Not open to students majoring in Civil E.

Fluid properties; hydrostatics; flow concepts; continuity, energy, and momentum equations and applications; flow measurements, pipe and channel flow; selected topics in groundwater flow. Ricca.

### 516 U G 4 Water Resources Engineering

W, Sp. 4 cl.

Prereq.: 405, 413, and Engr. Gr. 200.

Not open to students with credit for 517.

Pipe systems, introduction to open channel flow, basic hydrology, demographic studies, water supply, and wastewater flows. Ricca and Stiefel.

### 518 U G 4 Environmental Quality

Sp. 4 cl.

Prereq.: 516.

Not open to students with credit for 617.

Introduction to environmental quality; air pollution; solid waste disposal; water quality and treatment; wastewater characteristics and treatment. Stiefel and Sykes.

**519 U G 3****Applied Hydraulics**

Sp. 3 cl.

Prereq.: 516.

Not open to students with credit for 515.

Civil engineering applications of fundamental fluid mechanics principles including drag, closed and open conduit flow, flow measuring devices; and water hammer; laboratory demonstrations. Ricca and Stiefel.

**521† U G 3****Water Distribution and Wastewater Collection**

A. 2 cl., 1 3-hr. lab.

Prereq.: 519.

Not open to students with credit for 617.

Design of water supply collection, transmission and distribution systems; design of sewage and storm water collection and disposal systems. Ricca, Stiefel, and Sykes.

**522 U G 4****Design of Treatment Facilities**

W. 3 cl., 1 3-hr. lab.

Prereq.: 521.

Not open to students with credit for 726 or 727.

Hydraulic and process considerations in the design of water treatment and municipal wastewater treatment facilities. Stiefel and Sykes.

**530 U G 3****Elementary Structural Engineering**

Sp. 3 cl.

Prereq.: Engr. Mech. 420.

Not open to students majoring in Civil E.

Structural analysis of simple structures; introduction to reinforced concrete. Ojalvo.

**531 U G 4****Structural Analysis II**

Sp. 4 cl.

Prereq.: 430 or 530, and Engr. Mech. 420.

Deflections in trusses, beams, and frames; solution of indeterminate structures by methods of consistent deformations, and moment distribution. Chen, Ojalvo, and Smith.

**532 U G 4****Structural Steel Design**

Sp. 3 cl., 1 2-hr. lab.

Prereq.: 531.

Not open to students with credit for 631.

Design of steel structures. Ojalvo and Smith.

**534 U G 4****Structural Engineering Behavior**

W, Sp. 3 cl., 1 2-hr. lab.

Prereq.: 431.

Mechanics of beams, shear center, unsymmetrical bending, columns, plastic bending, limit loads, properties of structural metals, proportioning beams for flexure.

**540 U G 4****Civil Engineering Systems**

A, W. 4 cl.

Prereq.: 406.

Basic concepts and methods of systems engineering and applications to civil engineering problems in transportation and water resources planning, structural design, and construction management.

**551 U 4****Soil Mechanics I**

A. 3 cl., 1 3-hr. lab.

Prereq. or concur.: Engr. Mech. 420.

Basic and engineering soil properties; fluid flow through soils; compaction, effective stresses and compression. Gray.

**552 U G 4****Construction Materials**

W. 3 cl., 1 3-hr. lab.

Prereq.: 451.

Composition, properties, and production of portland cement concrete, bituminous materials, and bituminous mixtures. Majidzadeh.

**553 U G 3****Soil and Structural Mechanics**

W. 3 cl.

Prereq.: Engr. Mech. 420.

Properties of soils and structural materials and their application to analysis of stresses and displacements in soil masses and structural members. Wu, Ojalvo, and Sandhu.

**554 U G 4****Geotechnical Engineering**

W, Sp. 4 cl.

Prereq.: 451 and Engr. Mech. 420.

Properties of natural soil deposits and subsoil exploration; engineering solutions to problems of slope stability, foundation settlement and earth pressure. Wu.

**576 U G 4****Civil Engineering Economics and Planning**

W, Sp. 4 cl.

Prereq.: 470 and 540.

Engineering economics applied to public works, analysis and planning of transportation systems; discussion of system models with regard to demand distribution and assignment of traffic. Hawnn and Treiterer.

**577 U G 4****Transportation Analysis and Operation**

Sp. 3 cl., 1 3-hr. lab.

Prereq.: 576.

Analysis of factors affecting operation and control of transportation systems and evaluation of performance, efficiency, and safety.

**582† U 3****Mining Systems Engineering**

A. 3 cl.

Prereq.: 552 and Geol. 100.

Fundamentals of mining systems for bedded, massive, vein, and surface deposits.

**602 U G 4****Applications of Photo Interpretation in Land Use Planning**

A. 3 cl., 1 3-hr. lab., 2 half-day field trips.

Prereq.: Advanced or grad. standing in City-Reg. Plan., Agr. Econ., Agr. E., Agron., Geog. and related areas.

Not open for credit to students majoring in Civil E.

The nature, scope, principles, and methodology of, and techniques of photo interpretation and their applications in the analysis of land use. Mintzer.

**603 U G 4****Remote Sensing of Environment**

A. 3 cl., 1 3-hr. lab.

Prereq.: 402, Engr. Gr. 200, Math. 254, and Phys. 133.

An introductory overview of current remote sensing systems concerning energy regime that can be measured to monitor the environment. Mintzer.

**610 U G 4****Analysis of Natural and Polluted Waters**

A. 3 cl., 1 3-hr. lab.

Prereq.: 518 or grad. standing.

A laboratory study of the measurement and interpretation of water quality indices and pollution parameters including BOD, COD, alkalinity, nutrients, pH, and heavy metals. Rubin.

**613 U G 4****Applied Hydrology**

A. 4 cl.

Prereq.: 510 or 519 or equiv.

Hydrologic cycle, meteorology, streamflow, evapotranspiration, hydrographs, runoff relations, runoff hydrographs, groundwater, unit hydrographs, flood routing, frequency and duration studies, and application of hydrologic techniques. Ricca.

**614 U G 3****Intermediate Fluid Mechanics**

W. 2 cl., 1 3-hr. lab.

Prereq.: 406 and 413.

Ideal fluid, irrotationality, equations of motion, velocity potential, Laplace equation, Bernoulli equation, stream functions, flow patterns; flow nets and numerical solutions; experimental analogies; turbulent flow equations. Ricca.

**617 U G 4****Water Resources Engineering Principles II**

A. 4 cl.

Prereq.: 517 or 611.

Not open to students with credit for 612.

Not open for grad. credit for students majoring in Civil E.

Unit operations in wastewater supply and wastewater recovery including selection, treatment methods and equipment, and quality criteria. Rubin and Stiefel.

**632 U G 5****Reinforced Concrete Design I**

A. 5 cl.

Prereq.: 531 and 552.

Not open for grad. credit to students majoring in Civil E.

Analysis and proportioning of reinforced concrete members. Bishara and Chen.

**651 U G 5****Soil Mechanics**

A. 4 cl., 1 3-hr. lab.

Prereq.: 553.

Not open for grad. credit to students majoring in Civil E.

Stress distribution; shear phenomena, lateral earth pressure, settlement, and soil stability. Moore and Wu.

**653 U G 4****Principles of Rock Mechanics**

Sp. 4 cl.

Prereq.: 651.

Not open to students with credit for 581.

Fundamental rock properties and their measurement; analysis of rock masses; design and stabilization of underground openings and slopes.

**672 U G 3****Fundamentals in Traffic Engineering**

A. 2 cl., 1 3-hr. lab.

Prereq.: 572.

An introduction to traffic characteristics, measurements, controls, and regulations; elements in traffic operation, design, and planning. Treiterer.

**673 U G 3****Highway Location and Design**

W. 2 cl., 1 3-hr. lab.

Prereq.: 572.

Geometric design of roads and streets; determination of alignment, grade, intersections, and traffic capacity of rural roads. Nemeth.

**674 U G 4****Airport Design and Operation**

Sp. 3 cl., 1 3-hr. lab.

Prereq.: 572.

Airport configuration, design, and capacity; development of the terminal area; operational aspect of air traffic and the terminal area; design and operation of heliports. Treiterer.

**676 U G 3****Economic Analysis of Civil Engineering Projects**

A, W. 3 cl.

Prereq.: 576.

Principles of engineering economic analysis with emphasis on public investment in civil engineering projects and alternative designs and construction methods. Nemeth.

**683 U G 3****Construction Methods and Equipment**

A. 2 cl., 1 3-hr. lab.

Prereq.: 572 or 671.

Not open to students with credit for 771.

Selection and management of construction equipment in building of highways, dams, airports, bridges, and structures.

**684 U G 4****Management of Engineering Construction**

W, Sp. 2 cl., 2 2-hr. lab.

Prereq.: 781.

Not open to students with credit for 773.

Planning, scheduling, and supervision of engineering construction projects; use of Critical Path Method, bar charts, and other techniques.

**685 U G 3****Estimating Construction Projects**

Sp. 3 cl.

Prereq.: 684.

Role of the estimator in the construction industry; mechanics of formulating a detailed cost estimate including direct and indirect costs; bidding techniques.

**686 U G 3****Construction Contracts**

W. 3 cl.

Prereq.: 683.

Formulation of contracts, offer and acceptance, breach, damages; analysis of the engineer's responsibilities and liabilities determined by the contract documents of a construction contract.

**693 U G 3-5****Individual Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

Individual conferences, assigned readings and reports on minor investigations.

**701 U G 4****Civil Engineering Applications of Photo-Interpretation**

Sp. 2 cl., 2 2-hr. lab.

Prereq.: 402, 572, and 1 course in geol.

Principles of photo-interpretation, geology, and geomorphology applied to construction, transportation, and hydraulic problems; studies of air-photo indices of soils and aggregate sources; and construction problems. Mintzer.

**713 U G 4****Environmental Engineering Measurements**

W. 3 cl., 1 3-hr. lab.

Prereq.: 610 or permission of instructor.

The application of advanced physical and chemical measurements to environmental engineering problems; instrumentation involving spectrophotometric, chromatographic, respirometer, and radiation measurement techniques. Rubin.

**714 U G 5****Environmental Pollution Abatement**

W. 5 cl.

Prereq.: Senior or grad. majors in engineering or sciences.

Not open to students with credit for Agr. E. 714, Chem. E. 714, and Met. E. 714.

(Cross-listed in the Depts. of Agr. E., Chem. E., and Met. E.)

Problems, philosophies, principles, and methods of pollution abatement in the total environment; quantitative approaches to waste management in air, water, and land systems.

**717 U G 3****Industrial and Municipal Solid Waste Disposal**

W. 3 cl.

Prereq.: 518.

Characterization and sources of solid wastes; solid waste management; collection systems; processing; disposal; and recycle.

**719 U G 3****Stream Sanitation**

A. 3 cl.

Prereq.: 519; prereq. or concur. 610.

A study of stream quality standards; effluent standards; and the assimilative capacity of natural water bodies. Stiefel.

**721 U G 4****Design of Hydraulic Structures**

W. 4 cl.

Prereq.: 517 or 611.

Basic engineering economic studies, water law, design concepts, reservoir engineering, river hydraulics, spillways and energy dissipators, and wave motion and forces. Ricca.

**722 U G 4****Open Channel Hydraulics**

Sp. 4 cl.

Prereq.: 517 or 611.

Flow classifications, channel properties, energy and momentum principles, critical flow, uniform flow formulas, erodible and nonerodible channel design, and gradually varied flow profile computations. Ricca.

**731 U G 4****Reinforced Concrete Design II**

W. 4 cl.

Prereq.: 632.

Analysis and design of reinforced concrete systems. Bishara and Chen.

**732 U G 3****Timber Design**

W. 3 cl.

Prereq.: 532.

Basic properties of and design practice for timber when used as a construction material in engineering structures. Smith.

**734 U G 3****Design of Arch Structures**

Sp. 3 cl.

Prereq.: 531, 532, and 632.

The analysis and design of arch structures. Smith.

**735 U G 5****Matrix Structural Analysis**

Sp. 5 cl.

Prereq.: 531 or equiv.; or permission of instructor.

Not open to students with credit for 835.

Analysis of skeletal structures by force and displacement methods using matrices. Chen.

**736 U 4****Bridge Engineering Projects**

W. 4 cl.

Prereq.: 731.

Integrated student projects involving applications of principles and methods used in the design and construction of bridge structures. Smith.

**737 U G 3****Prestressed and Precast Concrete Structures**

W. 3 cl.

Prereq.: 632.

Structural analysis and proportioning of prestressed concrete members and of precast structural concrete systems. Bishara.

**738 U G 5****Plastic Analysis and Design**

A. 5 cl.

Prereq.: 532.

Not open to students with credit for 832.

Structural behavior in the inelastic range; prediction of collapse loads; structural design according to the plastic methods. Ojalvo.

**739 U G 5****Advanced Structural Engineering**

A. 5 cl.

Prereq.: 532.

Not open to students with credit for 830.

Analysis and design of statically indeterminate beams, frames, and trusses, using classical methods of analysis. Smith.

**751 U G 4****Principles of Foundation Analysis and Design**

W. 4 cl.

Prereq.: 651.

Subsurface exploration; shallow foundations; piles and caissons; embankments and excavations. Gary, Moore, and Wu.

**752 U G 4****Soil Stabilization and Earthwork Design**

Sp. 3 cl., 1 3-hr. lab.

Prereq.: 551 or 651.

Properties of compacted soils; principle of soil stabilization and earthwork design. Gray.

**753 U G 4****Pavement Design and Materials**

W. 3 cl., 1 3-hr. lab.

Prereq.: 552.

Not open to students with credit for 772.

Properties of paving mixtures, cementing binder and mixtures, and principles of pavement design and performance evaluation. Majidzadeh.

**754 U G 4****Mechanical Properties of Engineering Materials**

W. 4 cl.

Prereq.: 451.

Elasticity, plasticity, viscoelasticity, fatigue, and fracture phenomena in civil engineering materials. Jones.

**774 U G 5****Traffic Engineering I**

A. 4 cl., 1 3-hr. lab.

Prereq.: 572; prereq. or concur. 405 or Statist. 520.

Not open to students with credit for 871.

Traffic characteristics and studies: theory of traffic flow, dynamics of traffic movement, intersection performance, capacity, parking, accidents, origin-destination. Treiterer.

**775 U G 4****Transportation Systems**

A. 3 cl., 1 3-hr. lab.

Prereq.: 540.

An introductory course on techniques of analysis, planning and prediction for transportation systems, principally urban. Godfrey.

**794 U G 3-5****Group Studies in Civil Engineering**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs., not more than 10 of which shall be in any one of the following fields.

The student must register for particular topics from fields of civil engineering listed below; the topics, cr. hrs. and instructors will be announced in quarter previous to the quarter offered:

- a. Structural Engineering.
- b. Soil Mechanics and Foundations.
- c. Sanitary Engineering.
- d. Highway and Transportation Engineering.
- e. Geodetic and Photogrammetric Engineering.
- f. Construction.
- g. Materials.
- h. Hydraulics and Hydrology.

**795 U G 1****Seminar in Environmental Science and Engineering**

A, Sp. 1 2-hr. cl.

Prereq.: Grad. standing or permission of instructor.

Repeatable to a maximum of 4 cr. hrs.

Lectures and discussions by faculty and guest speakers of topics relating to environmental pollution and its control. Term paper required. Rubin.

**796 U G 1-5****Interdepartmental Seminar in Urban Transportation**

A, W, Sp.

(See under Interdepartmental Seminars)

**797 U G 1-5****Interdepartmental Seminars**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 6 cr. hrs.

(See under Interdepartmental Seminars)

**810 G 3****Physical Water and Wastewater Treatment Processes**

A. 3 cl.

Prereq.: 518; prereq. or concur. 610.

Principles and design of physical processes for water and wastewater treatment including screening, sedimentation, mixing, flotation, and filtration. Stiefel.

**811 G 4**  
**Biological Wastewater Treatment Processes**

W. 4 cl.

Prereq.: 810 or permission of instructor.

Principles and design of biological processes for wastewater treatment. Sykes.

**812 G 5**  
**Chemical and Advanced Wastewater Treatment Processes**

Sp. 4 cl., 1 3-hr. lab.

Prereq.: 811 or permission of instructor.

Principles of physical-chemical treatment processes for water and wastewater, including coagulation, softening, absorption, nutrient removal and disinfection. Rubin.

**813 G 3**  
**Physical and Biological Unit Operations**

W. 1 cl., 2 3-hr. lab.

Prereq.: 810; prereq. or concur. 811.

Unit operations laboratory for the physical and biological processes of water and wastewater treatment. Stiefel and Sykes.

**814 G 3**  
**Industrial Wastewater Treatment**

Sp. 3 cl.

Prereq.: 811; prereq. or concur. 812.

Principles of industrial wastewater treatment including wastewater surveys; flow reduction, and segregation and equalization; batch and continuous treatment; instrumentation; and treatment processes. Stiefel and Sykes.

**831 G 5**  
**Advanced Reinforced Concrete**

A. 5 cl.

Prereq.: 731 and 737.

Concrete structural analysis and design; special structural systems and elements. Bishara.

**833 G 5**  
**Concrete Shell Structures**

Sp. 5 cl.

Prereq.: 632 and Math. 512.

Analysis and design of folded plate, barrel, and other prismatic structures; domes, hyperbolic and elliptical paraboloids. Ojalvo.

**834 G 5**  
**Structural Analysis and Design for Dynamic Disturbances**

W. 5 cl.

Prereq.: 532, 731, and Engr. Mech. 410; or equiv.; or permission of instructor.

Structural dynamics; principles and practice of dynamic design; numerical and graphical methods. Chen.

**836 G 3**  
**Advanced Matrix Analysis of Structures**

A. 3 cl.

Prereq.: 735.

Comprehensive presentation of principles of structural analysis in matrix algebra language; efficient methods of analysis of complex structures; finite element method in structural analysis. Sandhu.

**837 G 4**  
**Advanced Structural Dynamics**

W. 4 cl.

Prereq.: 834 or Engr. Mech. 731.

Stresses and deflections in structures under dynamic loads; response of large structural systems to earthquake, wind, moving loads; approximate and exact solution techniques. Sandhu.

**838 G 4**  
**Two-Dimensional Problems in Linear Solids**

Sp. 4 cl.

Prereq.: 856; and Engr. Mech. 740 and 754.

Formulation of two-dimensional boundary value and initial boundary value problems for linear solids; geometric nonlinearities; refined theories; variational principles; approximate and exact solution techniques. Sandhu.

**850 G 4**  
**Seepage in Permeable Materials**

A. 4 cl.

Prereq.: 651.

Analysis of seepage volume and stresses in connection with excavation, dams, wells, slopes, and subsurface drainage; electro-osmosis. Gray and Wu.

**851 G 5**  
**Advanced Soil Properties**

W. 3 cl., 6 lab. hrs.

Prereq.: 651.

Detailed study and analysis of the mechanical properties of soils, with applications to foundation behavior. Gray, Moore, and Wu.

**852 G 5**  
**Structural Pavements and Earth Materials**

W. 5 cl.

Prereq.: 851 and 856.

Analysis and design of materials for pavements and other civil engineering projects; properties considered include fracture, fatigue, and physical-chemical composition. Majidzadeh.

**853 G 4**  
**Advanced Soil Mechanics**

Sp. 4 cl.

Prereq.: 851.

Plastic equilibrium of soil masses; stability of slopes and embankments; bearing capacity of shallow and deep foundations.

**854†\* G 3**  
**Theoretical Soil Mechanics**

W. 3 cl.

Prereq.: 850 and 851.



Use of mathematical and numerical methods in solution of soil mechanics problems; stress and displacements in soil masses and slopes, earthquake stresses, consolidation and frost penetration. Gray, Sandhu, and Wu.

**855\* G 4**  
**Soil-Structure Interaction**

Sp. 4 cl.

Prereq.: 851.

Interactions between soil and various structures, walls, bulkheads, foundations, and piles.

**856 G 5**  
**Viscoelasticity**

Sp. 5 cl.

Prereq.: 652 and Math. 512.

Viscoelastic materials and their characteristics, discrete element models, spectral representation, creep and relaxation functions, and dynamics of viscoelastic behavior. Majidzadeh.

**858\* G 3**  
**Soil Dynamics**

A. 3 cl.

Prereq.: 851 and Engr. Mech. 731, or permission of instructor.

Stress waves in soils and vibration in soil masses; soil behavior under impact and repeated loading; design problems including vibrating foundations, blast pressures, and seismic stability. Wu.

**870 G 5**  
**Highway Administration**

Sp. 5 cl.

Prereq.: 672.

A study of organization for planning, constructing, maintaining, and operating systems of roads and streets. Hawnn.

**872 G 5**  
**Traffic Engineering II**

W. 4 cl., 1 3-hr. lab.

Prereq.: 871 or equiv.

Principles of traffic operations in rural and urban areas: traffic laws, regulations, control and administration; street lighting, bus operation, parking, and terminal operations. Treiterer.

**873 G 5**  
**Traffic Engineering III**

Sp. 4 cl., 1 3-hr. lab.

Prereq.: 872 or equiv.

Urban transportation: principles of trip generation, forecasting distribution and assignment, network analysis, mass transportation planning, terminal location, evaluating alternative urban transportation systems, and trends in urban technology. Treiterer and Nemeth.

**885 G 3-5**  
**Advanced Civil Engineering**

Su, A, W, Sp.

Prereq.: Permission of dept. chairman.

Repeatable to a maximum of 20 cr. hrs., not more than 10 of which shall be in any one of the fields listed below.

This course is intended to give the advanced students opportunity to pursue advanced study; work undertaken may be elected in the following fields of civil engineering.

- a. Structural Engineering.
- b. Soil Mechanics and Foundations.
- c. Sanitary Engineering.
- d. Highway and Transportation Engineering.
- e. Geodetic and Photogrammetric Engineering.
- f. Construction.
- g. Materials.
- h. Hydraulics and Hydrology.

**896 G 1-3**  
**Interdepartmental Seminar in Polar and Alpine Studies**

Sp.

(See under Interdepartmental Seminars.)

**999 G Arr.**  
**Research in Civil Engineering**

Su, A, W, Sp.

Research for thesis or dissertation purposes only.

## Classics

Office: 217 Derby Hall, 154 North Oval Drive

**Professors** Morford (Chairman), Abbott, Babcock, Lenardon, and Forbes (Emeritus); **Associate Professors** Davis, Hahm, and Schlam; **Assistant Professors** Kratz, Shumaker, Snyder, and Tracy; **Instructor** Sweet.

See also Greek and Latin and Medieval and Renaissance Studies.

**120 U 3**  
**Aspects of Greek Civilization**

A.

Not open to students with credit for 124, 125, 220, 221, 222, 224, or 225.

Introductory studies concentrating on one area such as: The Bronze Age; Fifth Century Greece; The Age of Alexander.

**121 U 3**  
**Aspects of Roman Civilization**

W.

Not open to students with credit for 124, 125, 220, 221, 222, 224, or 225.

Introductory studies concentrating on one area such as: The Republic; The Augustan Age; The Empire.

**122 U 3**  
**Aspects of Classical Religion and Mythology**

Su, Sp.

Not open to students with credit for 124, 125, 220, 221, 222, 224, or 225.

Introductory studies concentrating on one area such as: Saga; the Gods—Myth and Ritual; Roman Religion and Mythology.

**H124 U 5****The Greeks**

A. 2 2-hr. cl.

Prereq.: Open only to Freshman Scholars and freshmen enrolled in the Honors Program of a college; permission of Dept.

Discussion of the Greek achievement in literature, history, art, and archaeology. Tracy.

**H125 U 5****The Romans**

Sp. 2 2-hr. cl.

Prereq.: Open only to Freshman Scholars and freshmen enrolled in the Honors Program of a college; permission of Dept.

Discussion of the Roman achievement in politics, literature, architecture, law, and education.

**210 U 3****Classical Background of Scientific Terminology**

A, W, Sp. 3 cl.

Study of technical and scientific terms from Greek and Latin sources; roots, word elements, word formation, analysis; helpful in medical, biological, and kindred studies.

**220 U 5****Greek Literature in Translation**

A, W, Sp. 5 cl.

**221 U 5****Latin Literature in Translation**

A, W, Sp. 5 cl.

**222 U 5****Classical Mythology**

A, W, Sp. 5 cl.

Not open to students with credit for 122.

**224 U 5****Classical Civilization: Greece**

Su, A, Sp. 5 cl.

Not open to students with credit for 120.

A survey of ancient Greek civilization, concentrating upon important facets of literature, history, art, and archaeology.

**225 U 5****Classical Civilization: Rome**

W. 5 cl.

Not open to students with credit for 121.

A survey of the civilization of ancient Rome, concentrating upon important facets of literature, history, art, and archaeology.

**501\* U G 3****Studies in Ancient Tragedy**

A. 3 cl.

Prereq.: One of the following: 120, 121, 122, H124, H125, 220, 221, 222, 224, 225; Comp. Lit. 101, 102, 103; Engl. 220, 262; Hist. 601, 602, 603, 604; Thtre. 165.

Studies in the form, content, and subsequent literary influence of Greek and Latin tragedy, based on readings of English translations.

**502\* U G 3****The Comic Spirit in Antiquity**

Sp. 3 cl.

Prereq.: One of the following: 120, 121, 122, H124, H125, 220, 221, 222, 224, 225; Comp. Lit. 101, 102, 103; Engl. 220, 262; Hist. 601, 602, 603, 604; Thtre. 165.

Studies in the comic literature of the Greco-Roman world, to be drawn from epic, drama, satire, and the novel. Abbott.

**503†\* U G 3****Studies in Greek and Roman Epic**

Sp. 3 cl.

Prereq.: One of the following: 120, 121, 122, H124, H125, 220, 221, 222, 224, 225; Comp. Lit. 101, 102, 103; Engl. 220, 262; Hist. 601, 602, 603, 604; Thtre. 165.

Studies in the form, content, and subsequent literary influence of Greek and Latin epic, based on readings of English translations. Davis.

**504†\* U G 3****Religious Thought and Institutions in the Greco-Roman World**

A. 3 cl.

Prereq.: One of the following: 120, 121, 122, H124, H125, 220, 221, 222, 224, 225; Anthro. 515; Hist. 601, 602, 603, 604; Philos. 210, 270, 511; Pol. Sc. 365.

Selected topics from the history of Greek and Roman religion, based on readings in ancient and secondary sources. Hahm.

**505†\* U G 3****Political Thought and Institutions in the Greco-Roman World**

Sp. 3 cl.

Prereq.: One of the following: 120, 121, 122, H124, H125, 220, 221, 222, 224, 225; Anthro. 515; Hist. 601, 602, 603, 604; Philos. 210, 270, 511; Pol. Sc. 365.

Selected topics concerning the development of ancient political theory. Babcock.

**506†\* U G 3****Greek and Roman Science and Technology**

A. 3 cl.

Prereq.: One of the following: 120, 121, 122, H124, H125, 220, 221, 222, 224, 225; Anthro. 515; Hist. 601, 602, 603, 604; Philos. 210, 270, 511; Pol. Sc. 365.

The origins and achievements of Greek and Roman science and technology. Hahm.

**694 U G 1-5****Group Studies**

W.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Investigation of particular problems in various areas of classical studies.

**699 U 5****Senior Tutorial and Essay**

A, W, Sp.

Open only to seniors majoring in Classics.

Individual work leading to the writing of a final paper that will integrate the experience of earlier courses in classics.

**H783 U G 3-5****Honors Course**

Su, A, W, Sp. Arr.

Prereq.: 4th yr. standing with a grade of A in at least half of the Classics courses taken and with an average of B in the remainder; permission of instructor under whose supervision the work is to be completed and the Arts and Sciences Honors Committee. Failure to receive a mark of S in this course is a disqualification for special honors.

A program of study arranged for each student, with individual conferences, reports and an Honors thesis.

## Comparative Literature and Languages

Office: 227 Derby Hall, 154 North Oval Drive

Mr. Lawson (Chairman); **Professors** Haber (Emeritus) and Rodgers (Emeritus); **Assistant Professors** Boyer, Brooks, Burkman, Callander, and Wehner; **Instructor** Rodriguez.

**101 U 5****Man Views Himself Through Literature: Social and Individual Man**

A, W, Sp.

H101 (Honors) may be available to students enrolled in a college Honors Program.

1st or 2nd yr. standing only.

101, 102, and 103 provide a sequence but may be taken independently.

Literary examples of the conflict between man's existence as social being and the urge to maintain authenticity of his inner life; Iliad to Kafka.

**102 U 5****Man Views Himself Through Literature: Religious and Secular Man**

A, W, Sp.

1st or 2nd yr. standing only.

H102 (Honors) may be available to students enrolled in a college Honors Program.

101, 102, and 103 provide a sequence but may be taken independently.

Man's attempt to cope with ultimate problems of existence lead to variety of responses; Divine Order (Dante) to universe without any discernible order (Beckett).

**103 U 5****Man Views Himself Through Literature: Rational and Passionate Man**

A, W, Sp.

1st or 2nd yr. standing only.

H103 (Honors) may be available to students enrolled in a college Honors Program.

101, 102, and 103 provide a sequence but may be taken independently.

Development of rational and passionate in human nature; Lucretius to Heller show man's attempt to reconcile, ignore, or suppress one at expense of the other.

**201 U 5****Absurdist Drama and Theory**

A, W, Sp. 5 cl.

Prereq.: 3 cr. hrs. in literature.

Study of absurdist authors; several critical-theoretical works about contemporary comedy and the study of comic antecedents.

**202 U 5****The Picaresque Tradition**

A, W, Sp. 5 cl.

Prereq.: 3 cr. hrs. in literature.

Concentrating exclusively on the picaresque tradition in European and American literature from origins in the 16th century to counterpart in present.

**203 U 5****Shorter Prose Forms**

A, W, Sp. 5 cl.

Prereq.: 3 cr. hrs. in literature.

Systematic study of the essay: its development as a genre; various forms and styles; broad selection for comparative purposes of famous essays.

**301 U 5****Concepts of Love in European Literature**

A. 5 cl.

Prereq.: 5 cr. hrs. in literature and jr. standing.

Study of various concepts of love as they appear in and influence European literature from ancient authors to Shaw.

**302 U 5****Women Prose Writers of the 19th and 20th Centuries**

W. 5 cl.

Prereq.: 5 cr. hrs. in literature and jr. standing.

An evaluation of women as creators and subjects of literature.

**303 U 5****Confessional Literature of Continental Europe: The Self Revealed**

Sp. 5 cl.

Prereq.: 5 cr. hrs. in literature and jr. standing.

Study of the individual as revealed in personal literature; memoirs, confessions, autobiographies, and novels containing substantial portions of autobiographical material.

**501 U 5****Myth and Ritual in Dramatic Literature**

W, Sp. 5 cl.

Prereq.: 10 cr. hrs. in literature and jr. standing.

Investigation of ways dramatic art is built on mythical and ritual patterns; exploration of the common concerns of ritual, myth, dramatic structure.

**502 U 5****Archetypal Patterns in the Novel**

A. 5 cl.

Prereq.: 10 cr. hrs. in literature and jr. standing.

Theories applicable to archetypes and primitive ritual in the novel.

**503 U 5****Satire: The Artist's Critique of His World**

Sp. 5 cl.

Prereq.: 10 cr. hrs. in literature and jr. standing.

Evolution of the satiric mode; forms, aims, moral implications; stylistic and aesthetic qualities of each individual work will be examined.

**594 U 1-5****Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Not open to freshmen or sophomores.

Repeatable to a maximum of 10 cr. hrs.

Designed to give groups of able students an opportunity to pursue special studies not otherwise offered.

**693 U 5-10****Individual Studies**

Su, A, W, Sp. Arr.

Prereq.: Jr. standing and permission of chairman.

Not open to freshmen or sophomores.

Repeatable to a maximum of 10 cr. hrs.

Designed to give able students an opportunity to pursue special studies not otherwise offered.

**H783 U 5-10****Honors Course**

Su, A, W, Sp. Arr.

Prereq.: 4th yr. standing with a grade of A in at least half of the Comp. Lit. courses taken and an average of B in the remainder; permission of the instructor under whose supervision the work is to be completed and the Arts and Sciences Honors Committee.

Repeatable to a maximum of 10 cr. hrs.

Failure to receive a mark of S in this course is a disqualification for special honors.

Senior Honors course leading to graduation with **distinction**; independent study for the student with special aptitude.

## Computer and Information Science

Office: 103 Caldwell Laboratory, 2024 Neil Avenue

**Professors** Yovits (Chairman), Bojanic, Hang, Kearns, LaRue, McGhee, Pepinsky, Reeves, Rothstein, and Saltzer; **Associate Professors** Breeding, Chandrasekaran, Ernst, Foulk, Hsiao, Kerr, Lazorick, Liu, Petrarca, Randels, Rush, and White; **Adjunct Associate Professor** Wigington; **Assistant Professors** Biermann, Buttelmann, DeLutis, Koehl, Mathis, and Reeker; **Adjunct Assistant Professor** Wagner.

**201 U 3****Elementary Digital Computer Programming**

Su, A, W, Sp. 3 cl.

Not open to students with credit for 211, 221, 240, 241, or Engr. Gr. 200.

Introduction to programming; laboratory experience with computers; emphasis on social science applications. Not recommended for students who plan to continue Computer and Information Science courses.

**211 U 3****Computer Data Processing I**

Su, A, W, Sp. 3 cl.

Prereq.: Math. 116, 121, or 150.

Not open to students with credit for 201, 221, 240, 241, or Engr. Gr. 200.

Introduction to electronic computers, computer programming, and sequential data processing concepts; laboratory work emphasizes business-oriented applications.

**212 U 4****Computer Data Processing II**

Su, A, W, Sp. 4 cl.

Prereq.: 211, 221, 240, 241, or Engr. Gr. 200.

Not open to students with credit for 440.

Business data processing principles and programming; topics include external sorting techniques, characteristics of direct access storage devices, concepts of multiple program systems.

**221 U 3****Programming and Algorithms I**

Su, A, W, Sp. 3 cl.

Prereq.: Math. 152.

Not open to students with credit for 201, 211, 240, 241, or Engr. Gr. 200.

Algorithms, programs and computers; basic programming and program structure; emphasis on scientific computing.

**222 U 3****Programming and Algorithms II**

Su, A, W, Sp. 3 cl.

Prereq.: 211, 221, or Engr. Gr. 200.

Not open to students with credit for 241.

Algorithms, programs and computers; basic data structures; survey of computers; emphasis on nonnumerical computing.

**294 U 1-5****Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Students are given an opportunity to pursue special studies not otherwise offered.

**311 U 4****Introduction to File Design and Analysis**

A. 4 cl.

Prereq.: 212, 222, or permission of instructor.

Principles of secondary storage data organization and maintenance; examination of sequential and direct file structures on tape and direct access devices.

**411 U 4****Design of On-Line Systems**

W. 4 cl.

Prereq.: 212, 222, or permission of instructor.

Introduction to environment and processing requirements for on-line systems; emphasis on both hardware and software components, and on evaluation procedures for such systems.

**422 U 5****Topics in Computing for Engineers**

Su, A, W, Sp. 5 cl.

Prereq.: 201, 211, 221, or Engr. Gr. 200.

Not open to Computer and Information Science majors.

A second course in computing for engineering students, but not confined to engineering problems; computer problem solving; computer systems, processing of business and numerical data.

**494 U 1-5****Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Designed to give the student an opportunity to pursue special studies not otherwise offered.

**505 U G 5****Fundamental Concepts of Computer and Information Science**

A, W. 5 cl.

Prereq.: 211, 221, or Engr. Gr. 200.

Introduction to the fundamental concepts of computer and information science with a survey of the principal areas of activity in the discipline.

**509 U G 5****Survey of Computer and Information Science for High School Teachers**

Su. 5 cl.

Prereq.: Permission of instructor.

Open only to NSF Summer Institute participants.

An introduction to the nonprogramming areas of computer and information science, including language and communication, information theory, artificial intelligence, and computer assisted instruction.

**541 U G 5****Survey of Numerical Methods**

Su, A, W, Sp. 5 cl.

Prereq.: 240, 241, or Engr. Gr. 200; concur. Math. 255 or 556.

Not open to students with credit for 640.

Basic techniques of numerical analysis; finite differences, interpolation, solution of equations, numerical integration and differentiation; engineering and scientific applications; laboratory use of computers.

**542 U G 3****Introduction to Computing in the Humanities**

A, W, Sp. 3 cl.

Prereq.: Jr. standing.

Use of non-numerical programming language for editing and collating texts, for forming indices and concordances, and for studies of style, attribution, and literary influence.

**543 U G 5****Intermediate Digital Computer Programming**

Su, A, W, Sp. 5 cl.

Prereq.: 212 or 222.

Introduction to symbolic assembler language, program linkage, input-output instructions, and machine organization; laboratory use of computers.

**548 U G 5****Digital Computer Programming for High School Teachers**

Su. 5 cl.

Prereq.: Permission of instructor.

Open only to NSF Summer Institute participants.

A basic course in the history, organization, use and programming of computers; laboratory experience with computers.

**549 U G 3****Numerical Analysis for High School Teachers**

Su. 3 cl.

Prereq.: Permission of instructor.

Open only to NSF Summer Institute participants.

Basic techniques of numerical analysis; finite differences, interpolation, solution of equations, integration; laboratory use of computers.

**550 U G 5****Introduction to Information Storage and Retrieval**

A, W, Sp. 5 cl.

Prereq.: 211, 221, or Engr. Gr. 200.

Introduction to fundamental concepts of information storage and retrieval; discussion of existing systems and their shortcomings; emphasis on current research and new developments.

**555 U G 5****Survey of Programming Languages**

Su, W, Sp. 5 cl.

Prereq.: 543.

Survey of programming languages for digital computers, comparison of various procedure-oriented languages; implementation techniques.

**594 U G 1-5****Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Designed to give the student an opportunity to pursue studies not otherwise offered.

**Human Performance**

(See under Psych. 620.)

**610 U G 5****Principles of Man-Machine Interaction**

W, Sp. 5 cl.

Prereq.: Grad. standing or permission of instructor.

Not open to students with credit for Psych. 620.

Systems concepts, their measurement and modeling; behavioral processes: sensing, learning, memory, complex information processing, and decision making; interface theory and interactive systems.

**640 U G 5****Numerical Analysis**

A, Sp. 5 cl.

Prereq.: 212, 222, or Engr. Gr. 200; Math. 255 or 556, and Math. 550; or grad. standing and permission of instructor.

Mathematical analysis of standard numerical methods for interpolation, approximation, and quadrature; numerical solution of nonlinear equations and ordinary differential equations.

**641 U G 5****Computer Systems Programming I**

Su, A, W, Sp. 5 cl.

Prereq.: 543 or permission of instructor.

Usage of symbolic assembler language and macro assembler programming; introduction to assemblers, compilers, data structures, operating systems, and machine architecture.

**642 U G 5****Numerical Linear Algebra**

W. 5 cl.

Prereq.: 541 or 640, and Math. 571 or 601.

Numerical treatment of systems of linear equations, inversion of matrices, and characteristic roots and vectors of matrices.

**643 U G 5****Linear Optimization Techniques in Information Processing**

A. 5 cl.

Prereq.: 222, and Math. 571 or 601.

Theory of linear programming and dualing methods; design and use of computer solutions; post-optimal analysis; computer economics; integer programming.

**644 U G 5****Advanced Computer Programming**

A, W. 5 cl.

Prereq.: Grad. standing in Compu. and Info. Sc. or permission of instructor.

Not open to students with credit for 641.

Introduction to symbolic assembler language, data structures, and macros; advanced computer programming techniques and application.

**652 U G 3****Modeling of Information Systems**

A. 3 cl.

Prereq.: Statist. 426 or 521.

Construction of models of information systems; information system components; waiting line models; simulation models; applications of modeling and simulation of information systems.

**675 U G 5****Digital Computer Organization**

Su, W. 5 cl.

Prereq.: 543 and Math. 577, or grad. standing in Compu. and Info. Sc.

Not open to students with credit for Elec. E. 760.

Boolean algebra, simplification of switching circuits, memory elements, design of arithmetic units and control units, error-correcting codes.

**680 U G 5****Data Structures**

Sp. 5 cl.

Prereq.: 641 or 644, and Math. 577; or grad. standing.

Data structure configurations; stacks, linked lists, and trees; dynamic storage allocation; searching and sorting techniques.

**693 U G 1-5****Individual Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Students are given an opportunity to pursue special studies not otherwise offered.

**694 U G 1-5****Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Students are given an opportunity to pursue special studies not otherwise offered.

**705 U G 5****Mathematical Foundations of Computer and Information Science**

A, Sp. 5 cl.

Prereq.: Grad. standing in Compu. and Info. Sc. or permission of instructor.

Concepts of system theory, formal logic; models of computation; Shannon theory of information for discrete systems; concepts of message, symbols, coding.

**706 U G 3-5****Information Theory in Behavioral Science**

A. 3 cl.

Prereq.: Permission of instructor.

Communication-theoretic models of human information processing; uncertainty and structure as unifying concepts in behavioral science; information-theoretic measures applied to variables affecting human performance.

**712\* U G 5****Man-Machine Interface**

W. 5 cl.

Prereq.: Math. 254 and Psychol. 620.

Information continuity and system operation; information display and regulation; role and usage of operator in information acquisition and transmissions, automation, machine augmentation of operator function.

**720 U G 5****Introduction to Linguistic Analysis**

Su, W. 5 cl.

Prereq.: Permission of instructor.

Introduction to language structure; grammatical description of language; mathematical properties of language representative of information in sentences.

**726 U G 3****Theory of Finite Automata**

A. 3 cl.

Prereq.: 720 or permission of instructor.

Introduction to the mathematical theory of automata; mathematical background, various types of abstract machines, and decomposition theory of finite automata.

**727 U G 3****Turing Machines and Computability**

W. 3 cl.

Prereq.: 705 or 720 or permission of instructor.

Turing machines and equivalent models of effective computability; universality and undecidability; recursive functions, recursive and recursively enumerable sets; complexity of computation.

**728 U G 3****Topics in Theory of Computing**

Sp. 3 cl.

Prereq.: 726 or 727.

Further topics in theory of computing: automata, computability, and formal languages.

**730 U G 5****Basic Concepts in Artificial Intelligence**

W. 5 cl.

Prereq.: 705; prereq. or concur.: Statist. 521.

Basic concepts of artificial learning and intelligent systems; theories, contemporary models; implementation by hardware and computer simulation.

**735 U G 3****Statistical Methods in Pattern Recognition**

Sp. 3 cl.

Prereq.: 705 and Statist. 520, or permission of instructor.

Decision theory models in pattern recognition; parametric and nonparametric methods; linear machines; supervised and unsupervised learning; interactive clustering methods; feature selection; applications.

**740 U G 5****Computer Systems Programming II**

Sp. 5 cl.

Prereq.: 641 or 644.

Introduction to job, task, and data management, memory management, and system macro-instructions; expert use of job control language.

**Mathematic Foundations of the Design and Use of Automatic Systems I, II, III**

(See Math. 741, 742, and 743.)

**741 U G 3****Comparative Operating Systems**

Su. 3 cl.

Prereq.: 641 or 644.

A careful examination of a number of representative computer operating systems.

**745 U G 5****Numerical Solution of Ordinary Differential Equations**

Sp. 5 cl.

Prereq.: 640, or 541 and permission of instructor.

Not open to students with credit for 645.

Ordinary differential equations; Milne's method, Simpson's method, Runge-Kutta methods; two-point boundary value problems; experiments using computers.

**746 U G 5****Advanced Numerical Analysis**

Sp. 5 cl.

Prereq.: 642 and 745, or permission of instructor.

A careful treatment of some of the principal numerical algorithms; complete error analysis; emphasis on recent developments.

**750 U G 5****Modern Methods of Information Storage and Retrieval**

A, Sp. 5 cl.

Prereq.: 550, or grad. standing and permission of instructor.

Fundamental and modern concepts of storing and retrieving information; current problems and problem solutions.

**751 U G 3****Fundamentals of Document-Handling Information Systems**

W. 3 cl.

Prereq.: 750.

Fundamentals of information systems: types of systems; design principles; inputs; storage and maintenance; outputs; vocabulary control; monitoring and management; performance evaluation.

**752 U G 3****Techniques for Simulation of Information Systems**

W. 3 cl.

Prereq.: Statist. 426 or 521.

Introduction to the methodology and techniques of the design of computer simulation of information systems.

**753 U G 5****Theory of Indexing**

W. 5 cl.

Prereq.: 750

Purposes of indexes; ordering methods; types of indexes; human and automatic indexing; vocabulary control; coding of information; reliability; compilation and evaluation.

**754 U G 3****Language Processing for Information Storage and Retrieval**

Sp. 3 cl.

Prereq.: 720 and 750.

Aspects of natural and artificial language processing and its interreaction with information storage and retrieval; emphasis on the current state of the art.

**755 U G 5****Programming Languages**

W. 5 cl.

Prereq.: 641 or 644.

Theory and design of assemblers, compilers, and translators for digital computers; comparison of various procedure-oriented languages; implementation techniques.

**756 U G 4****Compiler Design and Implementation**

A. 3 cl.

Prereq.: 720, and 641 or 644.

Analysis of source language and generation of efficient object code, operator and operand stacks, subroutine and function compilation, and optimization techniques; students will write a simple compiler.

**760 U G 3****Selected Topics in the Mathematics of Information Handling**

Sp. 3 cl.

Prereq. or concur.: Statist. 521 and Math. 571.

Repeatable to a maximum of 6 cr. hrs.

Elements of mathematical theories underlying deterministic and stochastic information systems along with associated mathematical techniques.

**765 U G 5****Theory of Management Information Systems**

Sp. 5 cl.

Prereq.: 705, Psych. 620, and Statist. 520; or permission of instructor.

A study of the role of the information system, its components, and its relationship with information theory, decision theory, and organization theory.

**775 U G 3****Advanced Computer Organization**

A, Sp. 3 cl.

Prereq.: 675, and 641 or 644.

Specification of microprograms; number representation and arithmetic operations; computer organization and input-output organization.

**780 U G 4****File Structures**

Sp. 3 cl., 1 2-hr. lab.

Prereq.: 543 and 750.

Introduction to the methodology and techniques of file design, and description of techniques that have been used to implement these designs in automated information systems.

**781 U G 3****Aspects of Computer Graphics Systems**

Sp. 1 2-hr. cl.

Prereq.: 543; and 675, 712, or permission of instructor.

Discussion of hardware and software techniques involved in the field of computer graphics. The history of the techniques, the present technological status, and principles of importance in designing systems employing graphics consoles will be covered.

**788 U G 1-5****Intermediate Studies in Computer and Information Science**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.; subdivisions repeatable.

Intermediate work in one of the specialized areas of computer and information science is offered.

**788.01 Theory of Information****788.02 Information Storage and Retrieval****788.03 Theory of Automata****788.04 Artificial Intelligence****788.05 Pattern Recognition****788.06 Computer Systems Programming****788.07 Programming Languages****788.08 Computer Organization****788.09 Numerical Analysis****788.10 Man-Machine Interaction****788.11 Formal Languages****788.12 Management Information Systems****788.13 Biological Information Processing****788.14 Socio-Psychological Aspects of Information Processing****793 U G 1-5****Individual Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

The individual student is given an opportunity to pursue special studies not otherwise offered.

**794 U G 1-5****Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Students are given an opportunity to pursue special studies not otherwise offered.

**797 U G 1-5****Interdepartmental Seminar**

A, W, Sp. 1-5 cl.

Repeatable to a maximum of 6 cr. hrs.

(See under interdepartmental Seminars.)

**805 G 3-5****Information Theory in Physical Science**

W. 3-5 cl.

Prereq.: 705 or permission of instructor.

Logical structure of measurement and communication, resulting common areas of information theory and physical science; informational nature of organization; informational generalization of physical entropy, applications.

**806 G 3-5****Cellular Automata and Models of Complex Systems**

Sp. 3-5 cl.

Prereq.: 705 or permission of instructor.

Cellular automata and formal languages applied to problems of modeling complex systems, possible physical and biological realizations; techniques.

**812\* G 5****Computer and Information Science Research Methods**

Sp. 4 cl., 1 2-hr. lab.

Prereq.: Statist. 521 and 523.

Research strategy, statistical evaluation, design, analysis, and interpretation of data obtained from information systems experimentation.

**Human Performance Theory**

(See under Psych. 816.)



**820 G 3****Computational Linguistics**

Sp. 3 cl.

Prereq.: 212, 222, or 542; and 720 or Ling. 601.

Repeatable to a maximum of 6 cr. hrs.

Computational techniques in the study of language; contributions of linguistic theory and computer science to language data processing. Students will undertake a project in the area.

**835 G 3****Special Topics in Pattern Recognition**

A. 3 cl.

Prereq.: 735 and Statist. 521, or permission of instructor.

Image processing, scene analysis techniques, formal grammars and structural methods in pattern description, patterns and algorithms, character recognition, bio-medical, and other applications.

**840 G 3****Operating System Implementation**

A. 3 cl.

Prereq.: 740.

Advanced concepts in job, task, data, and memory management; multiprogramming and multiprocessing; implementation on a typical computer.

**845 G 5****Numerical Solution of Partial Differential Equations**

A. 5 cl.

Prereq.: 642 and 745.

Numerical solution of partial differential equations by finite-difference methods; treatment of parabolic, hyperbolic, and elliptic equations, consistency, convergence, and stability considerations.

**850 G 3****Theory of Information Retrieval I**

W. 3 cl.

Prereq.: 543 and 753.

Correlation of information retrieval theory and practice into a unified theory of information retrieval; existing and proposed retrieval systems will be examined and evaluated.

**851 G 3****Theory of Information Retrieval II**

Sp. 2 cl., 1 2-hr. lab.

Prereq.: 850.

Data processing techniques, modelling of retrieval systems, and feedback mechanisms; algorithms, system models, and computer programs will be prepared to demonstrate the information retrieval process.

**852 G 3****Design and Analysis of Information Systems Simulations**

Sp. 3 cl.

Prereq.: 652 or 752.

Consideration of the strategic and tactical problems of planning information systems simulation; analysis of the results of information systems simulation experiments; studies of significant information systems simulations.

**855 G 3****Formal Theory of Programming Languages**

W. 3 cl.

Prereq.: 726, 727, or 728.

Formal systems underlying various programming languages. Formal descriptions of semantics and syntax of programming languages and computer programs.

**865 G 3****Seminar on Socio-Psychological Aspects of the Information Sciences**

W. 3 cl

Prereq.: Permission of instructor.

Ecological, organizational, interpersonal, and intrapersonal aspects of information, production, exchange, and use.

**880 G 3****Advanced Theory of Computability**

A. 3 cl.

Prereq.: 727 or permission of instructor.

Machine-independent recursive function theory; enumeration, iteration, and recursion theorems; creative and productive sets; strong and weak reducibilities; degrees of unsolvability.

**888 G 1-5****Advanced Studies in Computer and Information Science**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.; subdivisions repeatable.

Advanced work in one of the specialized areas of computer and information science is offered.

**888.01 Theory of Information****888.02 Information Storage and Retrieval****888.03 Theory of Automata****888.04 Artificial Intelligence****888.05 Pattern Recognition****888.06 Computer Systems Programming****888.07 Programming Languages****888.08 Computer Organization****888.09 Numerical Analysis****888.10 Man-Machine Interaction****888.11 Formal Languages****888.12 Management Information Systems****888.13 Biological Information Processing****888.14 Socio-Psychological Aspects of Information Processing****889 G 1-5****Advanced Seminar in Computer and Information Science**

Su, A, W, Sp. 1-5 cl.

Prereq.: 2nd qtr. grad. standing in Compu. and Info. Sc. or permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Selected topics of particular current interest in both the research and applications of computer and information science are considered.

**899 G 1-5**  
**Interdepartmental Seminar**

A, W, Sp. 1-5 cl.  
 Repeatable to a maximum of 25 cr. hrs.  
 (See under Interdepartmental Seminars.)

**994 G 1-5**  
**Group Studies**

Su, A, W, Sp.  
 Prereq.: Permission of instructor.  
 Repeatable to a maximum of 10 cr. hrs.  
 Students are given an opportunity to pursue special studies not otherwise offered.

**999 G Arr.**  
**Research**

Su, A, W, Sp.  
 Research for thesis or dissertation purposes only.

## Dairy Science

Office: 116 Plumb Hall, 625 Stadium Drive

Professors VanDemark (Chairman), Barr, Brakel, Conrad, Fechheimer, Gomes, Harvey, Hibbs (Associate Chairman, Wooster), Ludwick, Porter, Porterfield, and Staubus; Associate Professors Allaire, Hines, Kaeser, and Taylor; Assistant Professors Palmquist, Pritchard, Schanbacher, Smith, and Willett; Instructors Fuller, Neuhaards, and Rader.

### Domestic Animals in the Service of Man

(See Animal Sc. 100.)  
 (Offered in cooperation with Depts. of Dairy Sc. and Poul. Sc.)

#### GENERAL PREREQUISITES FOR COURSES NUMBERED 200

Unless otherwise indicated, the prerequisites for 200-level courses are 45 cr. hrs. in collegiate courses, exclusive of ROTC and Phys. Ed.; or specified course(s) numbered 100-199.

**201 U 5**  
**Fundamentals of Dairy Science**

A, W. 3 cl., 2 2-hr. lab.  
 Prereq.: Biol. 100.  
 The production phases of the dairy industry and the physiological systems of dairy animals. Brakel.

**207 U 3**  
**Dairy Cattle Type Evaluation**

Sp. 1 2-hr lab., 1 4-hr. lab.  
 Prereq.: 201 and 15 cr. hrs. in Biological Sciences.  
 Dairy breed type standards and their application to herd improvement. Kaeser.

#### GENERAL PREREQUISITES FOR COURSES NUMBERED 300 AND 400

Unless otherwise indicated, the prerequisites for 300 and 400-level courses are 90 cr. hrs. in collegiate courses, exclusive of ROTC and Phys. Ed.; or specified course(s) numbered 100-399.

**340 U 5**  
**Dairy Herd Management**

W. 3 cl., 2 2-hr. lab.  
 Prereq.: 201 and 430.  
 Problems and practices concerned with efficient production of milk and successful operation of a dairy herd. Kaeser.

**420 U 5**  
**Principles of Animal Improvement**

A, W, Sp. 5 cl.  
 Prereq.: Animal Sci. 100, Math. 150 or equiv., and Genetics 140 or 314.  
 Not open to students with credit for Animal Sc. 420 or Poul. Sc. 420.  
 (Cross-listed in the Depts. of Animal Sc. and Poul. Sc.)  
 An introduction to the methods available for bringing about genetic change in farm animals. Fechheimer, Jaap, and Swiger.

**430 U 5**  
**Principles of Animal Nutrition**

Su (1st term), A, W, Sp. 4 cl., 1 2-hr. lab.  
 Prereq.: Chem. 102 or 122 and Math. 150 or equiv.  
 Not open to students with credit for Animal Sc. 430 or Poul. Sc. 430.  
 (Cross-listed in the Depts. of Animal Sc. and Poul. Sc.)  
 A study of fundamental principles of nutrition in mammals and birds. Cline, Latshaw, and Tyznik.

#### GENERAL PREREQUISITES FOR COURSES NUMBERED 500

Unless otherwise indicated, the prerequisites for 500-level courses are 15 cr. hrs. in courses in the same discipline numbered 200 or higher, or 10 cr. hrs. in courses numbered 200 or higher in the same discipline, plus 10 cr. hrs. in courses numbered 200 or higher in specified allied disciplines; or baccalaureate degree.

### Marketing Dairy Products

(See Agr. Econ. 526.)  
 (Offered in cooperation with the Dept. of Dairy Sc.)

**593 U 3 or 5**  
**Individual Studies**

Su, A, W, Sp.  
 H593 (Honors) may be available to students enrolled in a college Honors Program or eligible for enrollment.  
 Prereq.: Permission of instructor.  
 Special assignments and elementary research; students elect problems after conference with the instructor in charge.

#### GENERAL PREREQUISITES FOR COURSES NUMBERED 600

Unless otherwise indicated, the prerequisites for 600-level courses are 15 cr. hrs. in courses in the same discipline numbered 300 or higher, or 10 cr. hrs. in courses numbered 300 or higher in the same discipline, plus 10 cr. hrs. in courses numbered 300 or higher in specified allied disciplines.

#### 610 U G 3

##### Physiology of Lactation

A. 2 2-hr. cl.

Prereq.: Vet. Physiol. 211 and 20 cr. hrs. of Dairy Sc., Animal Sc., or vertebrate biology.

Not open to students with credit for Animal Sc. 610. (Cross-listed in the Dept. of Animal Sc.)

The physiological, endocrine, nutritional, and environmental factors influencing the synthesis and ejection of milk. Porter.

#### 612 U G 3

##### Physiology of Reproduction and Growth

Sp. 3 1-hr. lec.

Prereq.: Vet. Physiol. 211 and 20 cr. hrs. of Dairy Sc., Animal Sc., or vertebrate biology.

Not open to students with credit for Animal Sc. 612. (Cross-listed in the Dept. of Animal Sc.)

Physiology of the reproductive system and of growth and development in farm animals; factors influencing reproductive performance. Ludwick.

#### 613 U G 3

##### Laboratory in Reproductive Physiology and Artificial Insemination

Sp. 2 2-hr. lab.

Prereq. or concur.: 612.

Not open to students with credit for Animal Sc. 613. (Cross-listed in the Dept. of Animal Sc.)

Comparative anatomy and physiology of reproduction of farm animals; physiological bases for the use of artificial insemination in the research laboratory and in the field. Ludwick.

#### 631 U G 5

##### Nutrition and Feeding of Ruminant Animals

A, W, Sp. 4 cl., 1 2-hr. lab.

Prereq.: 430 or equiv.

Not open to students with credit for Animal Sc. 631. (Cross-listed in the Dept. of Animal Sc.)

The nutrition of dairy cattle, beef cattle and sheep; principles and practices. Cline, Staubus, and Tyznik.

#### 640 U G 5

##### Evaluation and Integration of Research for Dairy Operations

Sp. 5 cl.

Prereq.: 201, 340, 420, 430, Agr. Econ. 310.01, or 310.02, 5 cr. hrs. Physiol.

The integration of scientific principles to maximize efficiency in dairy operations. Brakel.

#### 694 U G 3-5

##### Group Studies

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

Special assignments and advanced research for groups; problems assigned after consultation with the instructor in charge.

#### GENERAL PREREQUISITES FOR COURSES NUMBERED 700

Unless otherwise indicated, the prerequisites for 700-level courses are 15 cr. hrs. in courses in the same discipline numbered 400 or higher, plus additional specified course(s) numbered 600 or higher.

#### 710 U G 3 or 5

##### Advanced Reproductive Physiology

Sp. 2 2-hr. cl.

Prereq.: 612 and acceptable courses in Physiol., Anat., and Biochem.

Not open to students with credit for Animal Sc. 710. (Cross-listed in the Dept. of Animal Sc.)

Recent advances in research in mammalian reproduction; optional individual research experience in reproductive problems with small and large mammals for additional credit. Gomes and VanDemark.

#### 720 U G 5

##### Genetics of Animal Populations

W. 5 cl.

Prereq.: 420 or Genetics 630 and 10 cr. hrs. in Math.

Not open to students with credit for Animal Sc. 720 or Poul. Sc. 720.

(Cross-listed in the Depts. of Animal Sc. and Poul. Sc.)

Theory and practice of analyzing and altering the genetic composition of animal populations. Swiger.

#### GENERAL PREREQUISITES FOR COURSES NUMBERED 800 AND 900

Unless otherwise indicated, the prerequisites for 800 and 900-level courses are 30 cr. hrs. in courses in the same discipline, or 20 cr. hrs. in the same discipline, plus 25 cr. hrs. in specified allied disciplines.

#### 800 G 1

##### Seminar

A, W, Sp. 1 cl.

#### 810 G 3

##### Advances in Physiology of Domestic Animals

A, W, Sp. 4-hr. cl.

Prereq.: Permission of instructor and acceptable courses in Physiol., Anat., and Biochem.

Not open to students with credit for Animal Sc. 810 or Poul. Sc. 810.

(Cross-listed in the Depts. of Animal Sc. and Poul. Sc.)

##### 810.01\* Adrenal Function

A.

Brown and Gomes.

##### 810.02†\* Endocrinology of Reproduction

W.

Gomes.

##### 810.03\* Immunology and Immunogenetics

Sp.

Hines.

##### 810.04†\* Thyroid and Parathyroid Function

A.

Hibbs.

**810.05†\* Mammalian Germ Cells**

W.

VanDemark.

**810.06†\* Biometehology and Animal Performance**

Sp.

Ludwick.

**820 G 3****Current Topics in Animal Genetics**

3 cl.

Prereq.: Acceptable courses in Animal Genetics, Math., and Statistics.

Repeatable to a maximum of 12 cr. hrs.

Not open to students with credit for Animal Sc. 820 or Poul. Sc. 820.

(Cross-listed in the Depts. of Animal Sc. and Poul. Sc.)

**820.01 Selection Index Theory**

Sp.

Allaire and Harvey.

**820.02\* Non-additive Genetic Variance**

W.

Harvey and Swiger.

**820.03\* Polymorphic Systems**

W.

Fechheimer.

**820.04†\* Simulation of Genetic Systems**

W.

Harvey.

**820.05†\* Cytogenetics of Animal Populations**

W.

Fechheimer.

**820.06†\* Physiological Indices in Animal Breeding**

A.

Jaap.

**830 G 3****Advanced Studies in Nutrition**

A, W, Sp. 3 or 4 cl.

Prereq.: Permission of instructor.

Not open to students with credit for Animal Sc. 830 or Poul. Sc. 830.

(Cross-listed in the Depts. of Animal Sc. and Poul. Sc.)

**830.01\* Energy**

A.

Conrad.

**830.02\* Minerals**

W.

Cline.

**830.03\* Proteins and Amino Acids**

Sp.

Mahan, Naber, and Vivian.

**830.04†\* Vitamins**

A.

Naber and Tyznik.

**830.05†\* Lipids**

W.

Palmquist.

**830.06†\* Laboratory Methods in Nutrition**

Sp.

Allred, Mahan, and Vivian.

**830.07\* Rumen Microbiology**

Su.

Dehority.

**885 G 5****Research Principles and Methods**

Su, Sp. 3 cl., 1 4-hr. lab.

Prereq.: Genetics 650, 8 cr. hrs. in Math., and 2 qtrs. grad. study.

Survey and analysis of research in dairy and animal science, literature reviews, collection of data, preparation of bibliographies, and presentation of reports. Gilmore and VanDemark.

**898 G 1****Interdepartmental Seminar in Nutrition and Food Technology**

Sp.

(See under Interdepartmental Seminars.)

**993 G 3 or 5****Individual Studies**

Su, A, W, Sp.

Exploratory research and advanced assignments; students elect problems after conference with the instructor in charge.

**999 G Arr.****Research**

Su, A, W, Sp.

Research for thesis or dissertation purposes only.

## Dance

Office: 2043 Millikin Road

**Professor** Alkire (Chairman); **Associate Professors** Blaine, Currier, Lilly, Venable, and S. Wynne; **Assistant Professors** Blum and Saul; **Instructors** Kimble, Kinney, Phillips, and D. Wynne.

**111 U 3****Techniques and Materials of Dance**

A. 11 lab. hrs.

Prereq.: Admission by qualifying audition and permission of Division Chairman.

Required of majors in Dance.

Technique: modern dance and ballet; improvisation.

**112 U 3****Techniques and Materials of Dance**

W. 11 lab. hrs.

Prereq.: 111 or equiv.

Required of majors in Dance.

Continuation of 111.

**113 U 3****Techniques and Materials of Dance**

Sp. 11 lab. hrs.

Prereq.: 112 or equiv.

Required of majors in Dance.

Continuation of 112.

**160 U 5****The Arts in Contemporary America**

A, W, Sp. 4 cl., 1 lab. hr.

(Cross-listed in the Div. of Art Education and the School of Music.)

A study of the role of the arts in American society based on live, recorded, and filmed performances and exhibitions.

**190 U 3**

**Ethnic Dance Forms**

A. 2 1-hr. lec., 4 1-hr. lab.

Prereq.: 112.

Folk forms as practiced by ethnic groups in selected cultures.

**198 U 1-5**

**Dance Workshop**

A, W, Sp. Arr.

Required of all majors in Dance.

Repeatable to a maximum of 15 cr. hrs.

Performance and production activities.

**200 U 3**

**Dance in the 20th Century**

A, W, Sp. 4 cl.

Not open to students with credit for 138.

Dance as a performing art in Europe and America; a survey of major stylistic trends, principal artists and their works.

**214 U 4**

**Techniques and Beginning Composition**

A. 12 lab. hrs.

Required of majors in Dance.

Technique: modern dance and ballet; composition.

**215 U 4**

**Techniques and Beginning Composition**

W. 12 lab. hrs.

Required of majors in Dance.

Continuation of 214.

**216 U 4**

**Techniques and Beginning Composition**

Sp. 12 lab. hrs.

Required of majors in Dance.

Continuation of 215.

**248 U 3**

**Reconstruction, Analysis, and Teaching of Folk Dance Forms**

A, Sp. 1 cl., 2 2-hr. lab.

Prereq.: 2 qtrs. of modern dance or equiv.

Movement techniques and styles inherent in folk dance forms with application to teaching.

**293 U 1-5**

**Individual Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Individual studies of specified problems in the field of dance.

**294 U 1-5**

**Group Studies**

Su, A, W, Sp.

Prereq.: Permission of chairman.

Repeatable to a maximum of 25 cr. hrs.

**299 U 2**

**The University Dance Company**

A, W, Sp. 3 or more hrs. of rehearsal.

Prereq.: Admission by audition to students enrolled in Dance Major Curriculum.

Repeatable to a maximum of 12 cr. hrs.

Performance opportunities; repertory includes works by resident and visiting choreographers and dances mounted through the use of Labanotation scores.

**438 U 3**

**Dance Notation I**

A, W. 2 cl., 2 1-hr. lab.

Basic principles of Labanotation; work in theory, reading, and writing.

**439 U 3**

**Dance Notation II**

W, Sp. 2 cl., 2 1-hr. lab.

Prereq.: 438 or permission of instructor.

Continuation of 438.

**531 U G 3**

**Theory and Practice of Modern Dance**

Sp. 2 cl., 3 lab. hrs.

Prereq.: Permission of instructor.

Foundations for teaching; laboratory problems, lectures, readings, and discussions.

**532 U G 3**

**Intermediate Dance Composition**

A. 6 lab. hrs.

Prereq.: Permission of instructor.

Problems in extended solos; duets.

**533 U 5**

**Dance Production**

A, W, Sp. 2 1-hr. cl., 10 lab. hrs.

Prereq.: Permission of instructor.

A study of the production problems in staging dance for the theatre; lectures, readings, and discussions.

**534 U G 5**

**Dance Techniques and Repertory I**

A. 15 lab. hrs.

Prereq.: 216 or equiv.

Technique: modern dance and ballet; repertory: learning a dance work scored in Labanotation.

**535 U G 5**

**Dance Techniques and Repertory II**

W. 15 lab. hrs.

Prereq.: 534.

Continuation of 534.

**536 U G 5**

**Dance Techniques and Repertory III**

Sp. 15 lab. hrs.

Prereq.: 439 and 535.

Technique: modern dance and ballet; repertory: reading a dance work from a Labanotation score.

**537 U G 3****Music for Choreography**

A. 3 1-hr. lec., 1 2-hr. lab.

Prereq.: 531 or equiv.

Study of music suitable for choreographic purposes and the various approaches to the use of music in dance composition.

**587 U 3-15****Student Teaching in Dance in Secondary Schools**

A, W, Sp.

Prereq.: Education 4th yr. standing.

Repeatable to a maximum of 15 cr. hrs.

Observation, participation, and teaching in a public school; individual and group conferences or seminars.

**589 U 2****Directed Teaching Experience in Dance**

A, W, Sp. 1 4-hr. lab.

Prereq.: Permission of departmental adviser.

Repeatable to a maximum of 6 cr. hrs.

**594 U G 1-5****Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Group studies of specified problems in the field of dance.

**600 U G 3****Advanced Notation**

A. 2 cl., 1 2-hr. lab.

Prereq.: 439 or equiv.

Repeatable to a maximum of 9 cr. hrs.

Advanced Labanotation.

**637 U G 2-6****Dance Technique and Repertory IV**

A. Arr.

Prereq.: 536 or equiv.

Technique: modern and ballet; repertory: new or repertory works; related units of study.

**638 U G 2-6****Dance Technique and Repertory V**

W. Arr.

Prereq.: 637 or equiv.

Continuation of 637.

**639 U G 2-6****Dance Technique and Repertory VI**

Sp. Arr.

Prereq.: 638 or equiv.

Continuation of 638.

**650 U G 4****Advanced Dance Composition**

A, Sp. 9 lab. hrs.

Prereq.: 439, 532 or equiv.

Choreographing a group dance; experience in casting and directing.

**657 U G 3****History of Dance I**

A. 4 cl.

Survey of dance as a communal activity, functioning as ritual, art, and play, with particular emphasis on dance in tribal cultures and in the Greek theatre. Wynne.

**658 U G 3****History of Dance II**

W. 4 cl.

Survey of dance from medieval times to the late 18th century, with particular emphasis on dance styles of the 15th through the 18th centuries. Wynne.

**659 U G 3****History of Dance III**

Sp. 4 cl.

Survey of dance in Europe and the United States from the end of the 18th century to the present with emphasis on ballet and modern dance. Wynne.

**660 U G 3****The Romantic Ballet**

A. 3 cl.

Prereq.: Grad. or senior standing and permission of adviser.

The ballet in France, Russia, and other influential centers from Neo-Classicism to the end of the 19th century.

**693 U G 1-5****Individual Studies in Dance**

Su, A, W, Sp.

Prereq.: Grad. or sr. standing and permission of adviser.

Repeatable to a maximum of 20 cr. hrs. for undergraduate credit and to a maximum of 30 cr. hrs. for graduate credit.

Investigation of selected professional problems.

**694 U G 1-5****Group Studies**

Su, A, W, Sp.

Prereq.: Permission of chairman.

Repeatable to a maximum of 25 cr. hrs.

**801 G 1-5****Seminar in Dance**

A, W, Sp.

Repeatable to a maximum of 15 cr. hrs.

**802 G 3-5****Choreographic Projects**

A, W, Sp.

Prereq.: 650 or equiv.

Repeatable to a maximum of 25 cr. hrs.

Advanced choreographic projects.

**994 G 3****Problems in Dance**

Su, A, W, Sp.

Advanced problems in dance, individual or group participation.

**999 G Arr.****Research in Dance**

Su, A, W, Sp.

Research for thesis purposes only.

## Dental Hygiene

Office: 3070 Dentistry Building, 305 West 12th Avenue

Nancy M. Reynolds, Chairman and Director

**Professors** J. R. Wilson (Dean), App, Blozis, Brooks, Bruce, Cavalaris, Clarke, Conroy, Cushman, Dew, Heintz, King, Kuhn, Long, Permar, W. Postle, Reynolds, S. Wallace, W. Wallace, Williams, and Woelfel;  
**Associate Professors** Beckwith, Foreman, Hall, Huffman, Porter, H. Postle, and Trippy; **Assistant Professors** Herr, Mote, Murphy, Pappas, Snyder, and Whitacre;  
**Instructors** Christian, Fox, Hockman, Jones, Komives, Korn, Kramer, Kuster, Lucks, Monteith, Nordstrom, Penland, Saunier, Spicer, and Sylvester.

**201 U 3****Dental Anatomy**

A. 1 cl., 6 lab. hrs.

Prereq.: Dent. Hyg. 1st yr. standing.

The morphology of human teeth and surrounding structures. Permar.

**203 U 2****Dental Anatomy**

W. 1 cl., 2 lab. hrs.

Prereq.: Dent. Hyg. 1st yr. standing.

A continuation of 201; the physiology of human teeth and surrounding structures. Permar.

**223 U 3****Dental Prophylaxis**

W. 1 cl., 6 lab. hrs.

Prereq.: Dent. Hyg. 1st yr. standing.

The demonstration of and the application of technical procedures for the removal of hard and soft deposits from the surfaces of the teeth. Reynolds.

**224 U 2****Dental Prophylaxis**

Sp. 1 cl., 3 clinic hrs.

Prereq.: Dent. Hyg. 1st yr. standing.

Clinical application of the principles and technical procedures taught in Dental Prophylaxis 223. Reynolds.

**233 U 2****Oral Histology and Embryology**

W. 2 cl.

Prereq.: Dent. Hyg. 1st yr. standing.

A study of the microscopic anatomy of the teeth and surrounding structures; the development of the teeth, oral cavity, and face. Permar.

**236 U 3****Chemistry for Dental Hygienists**

Sp. 3 cl.

Prereq.: Dent. Hyg. 1st year standing.

Not open to students with credit for 335.

A survey of general chemical principles and an introduction to fundamental physiological applications of organic chemistry for dental hygiene students. Foreman.

**263 U 1 or 2****Oral Radiography**

Sp. 2 cl., or 6 lab. hrs.

Prereq.: Dent. Hyg. 1st yr. standing or sr. standing in radiologic technology.

Not open to students with credit for 361.

The theory and technical procedures of oral radiography. Pappas.

**273 U 3****Dental Materials**

Sp. 1 cl., 6 lab. hrs.

Prereq.: Dent. Hyg. 1st yr. standing.

Not open to students with credit for 372.

A study of the composition, chemical and physical properties, manipulation, and uses of various materials employed in the practice of dentistry. Woelfel.

**283 U 1****Periodontology**

Sp. 1 cl.

Prereq.: Dent. Hyg. 1st yr. standing.

A study of the formation of deposits on teeth, the maintenance of good oral hygiene, and the prevention of periodontal disease. App.

**295 U 1****Survey of Dental Hygiene**

A. 1 cl.

Prereq.: Dent. Hyg. 1st yr. standing.

The historical, professional, legal, ethical and preventive aspects of dental hygiene. Reynolds.

**301 U 1****Pain Control**

W. 1 cl. or 3 lab. hrs.

Prereq.: Dent. Hyg. 2nd yr. standing.

The role of the dental hygienist as an assistant in anesthesia; premedication; physiological responses to and pharmacological actions of anesthetic agents; emergency treatment. Snyder.

**311 U 2****Dental Nursing**

A. 2 cl.

Prereq.: Dent. Hyg. 2nd yr. standing.

A discussion of ways in which the dental hygienist may assist the general practitioner of dentistry or one specializing in any field of dentistry. Reynolds.

**312 U 2****Dental Nursing**

W. 2 cl.

Prereq.: Dent. Hyg. 2nd yr. standing.

Problems which students encounter in the dental hygiene clinic; practical experience in dental assisting. Reynolds.

**313 U 1****Dental Nursing**

Sp. 1 cl.

Prereq.: Dent. Hyg. 2nd yr. standing.

A continuation of 312. The dental hygienist's responsibilities to her profession. Reynolds.

**321 U 4****Clinical Dental Prophylaxis**

A. 12 clinic hrs.

Prereq.: Dent. Hyg. 2nd yr. standing.

Clinical application of principles taught in 223. Reynolds.

**322 U 5****Clinical Dental Prophylaxis**

W. 14 clinic hrs.

Prereq.: Dent. Hyg. 2nd yr. standing.

A continuation of 321. Reynolds.

**323 U 4****Clinical Dental Prophylaxis**

Sp. 12 clinic hrs.

Prereq.: Dent. Hyg. 2nd yr. standing.

A continuation of 322. Reynolds.

**331 U 1****Pharmacology**

A. 1 cl.

Prereq.: Dent. Hyg. 2nd yr. standing.

A study of drugs commonly used in dental practice and correct methods for their use. Reynolds.

**334 U 2****Chemistry for Dental Hygienists**

A. 2 cl.

Prereq.: 236.

Not open to students with credit for 335.

Application of the principles of biological chemistry to the practice of dental hygiene. Foreman.

**341 U 3****Introduction to General and Oral Pathology**

A. 3 cl.

Prereq.: Dent. Hyg. 2nd yr. standing.

Basic principles of pathology; interpretation of the patient's medical history, pathogenesis and symptomatology of oral disease. Bruce and Cavalaris.

**381 U 1****Community Dental Health**

A. 1 cl.

Prereq.: Dent. Hyg. 2nd yr. standing.

An introduction to community dental health and the planning and initiation of community dental health projects. Lucks.

**382 U 2****Oral Hygiene in the Schools**

W. 2 cl.

Prereq.: Dent. Hyg. 2nd yr. standing.

The principles involved in effective dental health education of the general public, especially school children. Penland.

**383 U 1****Community Dental Health**

Sp. 1 cl.

Prereq.: Dent. Hyg. 2nd yr. standing.

A continuation of 381. An application of the principles learned in 381, the continuation and evaluation of community dental health projects. Lucks.

**393 U 2****Office Practices and Economics**

Sp. 2 cl.

Prereq.: Dent. Hyg. 2nd yr. standing.

The role of the dental hygienist in dental practice and the economics involved. Trippy.

**693 U G 1-5****Individual Studies in Dental Hygiene**

Su, A, W, Sp. Arr.

Prereq.: Written permission.

Repeatable to a maximum of 15 cr. hrs.

Advanced studies in any relevant area of dental hygiene. Reynolds.

**694 U G 1-5****Group Studies in Dental Hygiene**

S, A, W, Sp. Arr.

Prereq.: Written permission.

Repeatable to a maximum of 15 cr. hrs.

Group studies in special dental hygiene areas. Reynolds.

## Dentistry

Office: 1159 Dentistry Building, 305 West 12th Avenue

**Professors** J. R. Wilson (Dean), Allison, App, Blozis, C. Boucher, Bruce, Cavalaris, Conroy, Dew, Heintz, Kreider, Long, McConnell, Melfi, O'Brien, Pappas, Permar, Reynolds, Rosen, Russell, Solt, Wallace, Williams, Winter, Woelfel, and Zacherl; **Associate Professors** Beckwith, Bluff, Chandler, Cummins, Dilley, Foreman, A. Hall, Huffman, Larrimer, Parrish, Porter, Postle, Rosenblum, Spangenberg, Trippy, and Wade; **Assistant Professors** Ashelman, Blair, Bombach, J. Boucher, Brilliant, Brown, Brumfield, Burns, Carnes, Chapman, Christ, Clendenen, Cline, Dagetoerde, Dierksen, Downes, Emory, Erickson, Ford, Freese, Gump, Hagman, T. Hall, Hiatt, Hull, Humphrey, Jacob, Javid, Jefferis, Knoderer, Knouse, Kramer, Lauer, Linaburg, Lotz, McCoy, Metzler, Moor, Moore, Murphy, Natoli, Pagniano, Rumbaugh, Scott, Shannon, Skinner, Smith, Snyder, Sterling, Tanaka, Tootle, Turrell, Voss, Warman, Wheeler, H. Whitacre, and J. Whitacre.

**305 P 1****Dental Materials**

Su. 1 cl.

Prereq.: Dent. 1st yr. standing.

A review of physical properties of materials; a study of dental impression materials, cast materials, and denture base resins. Woelfel and Dew.



**306 P 1****Dental Materials**

Sp. 1 cl.

Prereq.: Dent. soph. standing.

Materials used in the restoration of carious teeth, including dental cements, waxes, plastics, amalgams, gold foil, and casting gold alloys. Chandler.

**307 P 4****Dental Morphology and Occlusion**

Su. 3 cl., 3 lab. hrs.

Prereq.: Dent. fresh. standing.

The structure and function of the teeth and their contiguous parts, particularly mastication through occlusion.

**308 P 5****Dental Morphology and Occlusion**

A. 3 cl., 2-3 hr. labs.

Prereq.: Dent. fresh. standing.

A continuation of 307.

**309 P 4****Dental Morphology and Occlusion**

W. 3 cl., 3 lab. hrs.

Prereq.: Dent. fresh. standing.

A continuation of 308.

**320 P 1****Orientation and History of Dentistry**

Su. 1 cl.

Prereq.: Dent. 1st yr. standing.

The evaluation of dentistry from the ancient period through the medieval, colonial, early American, and modern periods. Wilson.

**324 P 1****Dental Ecology**

Su. 1 cl.

Prereq.: Dent. fresh. standing.

Basic concepts in disease control principles of epidemiology, review of dental indices of disease, and a study of dental disease in a community: prevalence, increment and distribution.

**325 P 1****Dental Epidemiology I**

A. 1 cl.

Prereq.: Dent. 1st yr. standing.

An introduction to the study of mass disease and some aspects of dental epidemiology. Zacherl.

**326 P 1****Preventive Dentistry**

W. 1 cl.

Prereq.: fresh. standing.

Preventive dentistry; etiology of dental disease; clinical signs and symptoms; disease control; therapeutic and preventive agents, materials and techniques; and actualizing the potential in private practice.

**361 P 2****Preventive Periodontics**

Su. 2 cl. or 2 lab. hrs.

Prereq.: Dent. 1st qtr. standing.

Preventive periodontics includes periodontal morphology, incidence of periodontal disease, clinical gingival health and disease, and etiology and prevention of disease. App.

**381 P 4****Complete Prosthodontics**

Su. 1 cl., 6 lab. hrs.

Prereq.: Dent. 1st yr. standing.

The elemental principles of impressions and jaw relations and procedures used in the construction of complete dentures. Shannon.

**382 P 4****Complete Prosthodontics**

A. 1 cl., 8 lab. hrs.

Prereq.: Dent. 1st yr. standing.

The principles and practices of arranging artificial teeth and processing and finishing complete dentures. Shannon.

**389 P 5****Removable Partial Prosthodontics**

W. 1 cl., 8 lab. hrs.

Prereq.: Dent. 1st yr. standing.

An introduction to the principles of design and construction of removable partial dentures. Heintz.

**403 P 1****Local Anesthesia**

W. 1 cl.

Prereq.: Dent. 2nd yr. standing.

The theory, chemistry, and technique of local anesthesia for dental procedures. Hiatt.

**404 P 1****Dental Materials**

Su, Sp. 1 cl.

Prereq.: Dent. 2nd yr. standing.

A study of dental casting procedures and associated materials, dental gold alloy and base metal wires, chrome-cobalt and steel alloys, heat treatment of metals, welding and soldering procedures, and abrasives and polishing agents. Chandler.

**407 P 2****Occlusion**

Sp. 1 cl., 3 lab. hrs.

Prereq.: Dent. soph. standing.

A study of the changes in the masticatory systems which cause an unhealthy occlusion. Melfi.

**413 P 1****Endodontics**

W. 1 cl.

Prereq.: Dent. soph. standing.

Basic techniques and procedures used in the treatment of pulpless teeth. Brilliant.

**431 P 2****Operative Dentistry**

Su, Sp. 1 cl., 3 lab. hrs.

Prereq.: Dent. 2nd yr. standing.

An introduction to the principles of operative dentistry; the theory and techniques for simple cavity preparations. H. Postle and Huffman.

**432 P 3****Operative Dentistry**

A. 1 cl., 6 lab. hrs.

Prereq.: Dent. 2nd yr. standing.

The theory and technical procedures for the preparation of compound and complex cavities and the use of amalgams and silicate as restorative materials. H. Postle and Huffman.

**433 P 3****Operative Dentistry**

W. 1 cl., 6 lab. hrs.

Prereq.: Dent. 2nd yr. standing.

The theory and technical procedures for the use of gold inlays and gold as restorative materials; preparation for the clinical aspects of operative dentistry. H. Postle and Huffman.

**451 P 1****Pedodontics**

Sp. 1 cl.

Prereq.: Dent. soph. standing.

Orientation in pedodontics, patient management, and methods of prevention and control of dental caries. Hall.

**452 P 3****Pedodontics**

A. 1 cl., 2 lab. hrs.

Prereq.: Dent. 2nd yr. standing.

Orientation in pedodontics preparatory for clinical assignments; patient management, modified operative procedures in cavity preparation, pulp management, the manipulation of prefabricated materials, and methods of prevention and control of dental caries. Hall.

**453 P 2****Pedodontics and Interceptive Orthodontics**

W. 1 cl., 3 lab. hrs.

Prereq.: Dent. 2nd yr. standing.

Preparation of study casts; construction of orthodontic bands, using different materials and techniques; designing appliances for prevention, interception, or correction of incipient malocclusion. Hall and Williams.

**461 P 2****Periodontal Pathology and Clinical Diagnosis**

Sp. 2 cl. or 2 lab. hrs.

Prereq.: Dent. soph. standing.

Periodontal pathology and clinical diagnosis includes the microscopic, radiographic, and clinical study of all parts of the periodontium in health and disease.

**462 P 1****Periodontics**

A. 1 cl.

Prereq.: Dent. 2nd yr. standing.

The etiology, pathology, and diagnosis of periodontal disease. App.

**463 P 1****Periodontics**

W. 1 cl.

Prereq.: Dent. 2nd yr. standing.

Fundamental methods of prevention and treatment of periodontal disease. App.

**482 P 2****Complete Prosthodontics**

A. 1 cl., 3 lab. hrs.

Prereq.: Dent. 2nd yr. standing.

The principles and practices of the construction of immediate dentures, and of making esthetic denture restorations. Larrimer.

**483 P 3****Complete Prosthodontics**

W. 1 cl., 6 lab. hrs.

Prereq.: Dent. 2nd yr. standing.

The principles and practices of impression making as related to the anatomic, histologic, and physiologic considerations. Larrimer.

**484 P 2****Fixed Partial Prosthodontics**

Su, Sp. 1 cl., 3 lab. hrs.

Prereq.: Dent. 2nd yr. standing.

Principles and technical procedures; complete and partial crowns: preparation, fabrication, and casting in gold. Downes.

**485 P 3****Fixed Partial Prosthodontics**

A. 1 cl., 6 lab. hrs.

Prereq.: Dent. 2nd yr. standing.

Construction of fixed partial restorations utilizing basic types of retainers, fixed and semi-movable connectors, gold and acrylic pontics. Downes.

**486 P 3****Fixed Partial Prosthodontics**

W. 1 cl., 6 lab. hrs.

Prereq.: Dent. 2nd yr. standing.

Construction of fixed partial restoration with basic retainers and connectors and glazed porcelain pontic; fabrication of acrylic jacket crown. Downes.

**487 P 3****Removable Partial Prosthodontics**

Su, Sp. 1 cl., 6 lab. hrs.

Prereq.: Dent. 2nd yr. standing.

The relation of the diagnostic aspects of removable partial dentures to their design and construction. Heintz.

**489 P 1****Removable Partial Prosthodontics**

W. 1 cl.

Prereq.: Dent. 2nd yr. standing.

The advanced principles and design of removable partial dentures and their clinical applications. Heintz.

**501 P 1****Local Anesthesia and Oral Surgery**

Su, Sp. 1 cl.

Prereq.: Dent. 3rd yr. standing.

The chemistry and pharmacology of local anesthesia and an introduction to the basic principles of oral surgery. Hiatt and Snyder.

## 502 P 1

### Oral Surgery

A. 1 cl.

Prereq.: Dent. 3rd yr. standing.

Theory and technique of basic exodontia and minor oral surgery; postoperative complications and treatment. Hiatt and Snyder.

## 511 P 1

### Endodontics

A. 1 cl.

Prereq.: Dent. 3rd yr. standing.

The rationale and prognosis for endodontic procedures; application of clinical treatment techniques peculiar to endodontics including radiography, intra canal preparations, and root fillings. Brilliant.

## 513 P 2

### Endodontics

W. 1 cl.-2 clinic hrs.

Prereq.: Dent. 3rd. yr. standing.

Diagnostic procedures and the differential diagnosis of endodontic problems; systemic and local use of analgesic and antibiotic drugs; traumatic injuries and surgical procedures. Brilliant.

## 526 P 1

### Community Dentistry

W. 1 cl.

Prereq.: Dent. 3rd yr. standing.

An introduction to, philosophy of, equipment for, and problems encountered in the treatment of dental needs of the handicapped homebound patient. Lotz.

## 531 P 4

### Operative Dentistry

Su, Sp. 1 cl., 6 clinic hrs.

Prereq.: Dent. 3rd. yr. standing.

Clinical diagnosis of pulp disease; protection and conservative treatment of the vital pulp; factors influencing the success or failure of restorative materials in clinical practice. Beckwith.

## 532 P 4

### Operative Dentistry

A. 1 cl., 6 clinic hrs.

Prereq.: Dent. 3rd. yr. standing.

Detailed study of restorative materials; indications and contraindications for each; their manipulation and individual requirements in cavity preparation. Beckwith.

## 533 P 4

### Operative Dentistry

W. 1 cl., 6 clinic hrs.

Prereq.: Dent. 3rd. yr. standing.

Clinical application of the theories and techniques of restoring carious and defective teeth. Beckwith.

## 540 P G 4

### Oral Histology and Embryology

Su, Sp. 2 cl., 6 lab. hrs.

Prereq.: Anat. 640; Dent. 2nd yr. standing.

Embryology and histology of teeth and surrounding structures and their correlation to the practice of dentistry. Melfi.

## 541 P G 4

### Oral Pathology

Su, Sp. 3 cl., 2 lab. hrs.

Prereq.: Dent. 3rd yr. standing, 540 and Path. 655.

The histopathologic and clinical study of oral disease processes that are chiefly of local origin. Cavalaris.

## 542 P G 1

### Oral Pathology

A. 1 cl.

Prereq.: Dent. 3rd yr. standing.

The histopathologic and clinical study of oral disease processes that are associated with systemic disease or diseases of specific organ systems. Cavalaris.

## 544 P 1

### Oral and Physical Diagnosis

Sp. 1 cl.

Prereq.: Dent. soph. standing.

The principles and methods of diagnosis, with emphasis on the dental and medical history of the patient.

## 545 P 1

### Oral Diagnosis and Treatment Planning

A. 1 cl.

Prereq.: Dent. 3rd yr. standing.

The principles and methods of oral diagnosis, with emphasis on the medical and dental history of the patient. Blozis.

## 546 P 1

### Oral Diagnosis and Treatment Planning

W. 1 cl.

Prereq.: Dent. 3rd yr. standing.

The interpretation of signs and symptoms, medical laboratory tests, and treatment planning for the patient. Blozis.

## 547 P 1

### Oral Radiography

Su, Sp. 1 cl.

Prereq.: Dent. soph. standing.

The theory and operation of radiographic equipment; darkroom procedures; discussion of anatomical landmarks as seen radiographically; introduction of intraoral radiographic technics. O'Brien.

## 548 P 1

### Oral Radiography

A. 1 cl.

Prereq.: Dent. 3rd yr. standing.

Bisection of the angle and long cone technics used in intraoral radiography; extraoral radiographic technics. O'Brien.

## 549 P 1

### Oral Radiography

W. 1 cl.

Prereq.: Dent. 3rd yr. standing.

Interpretation of radiographic evidence of pathosis; hazards of ionizing radiation. O'Brien.

**551 P 1****Pedodontics**

Su, Sp. 1 cl.

Prereq.: Dent. 3rd yr. standing.

Detailed study of materials presented in 452; restorative materials used in pedodontics; the use of X-Ray in pedodontic practice. Hall.

**552 P 1****Clinical Pedodontics**

A. 2 clinic hrs.

Prereq.: Dent. 3rd yr. standing.

Hall.

**553 P 1****Clinical Pedodontics**

W. 2 clinic hrs.

Prereq.: Dent. 3rd yr. standing.

Continuation of 552. Hall.

**555 P 1****Orthodontics**

A. 1 cl.

Prereq.: Dent. 3rd yr. standing.

The etiology and classification of malocclusion, physiology of tooth movement, character of tissues involved. Williams.

**556 P 2****Orthodontics**

W. 2 cl.

Prereq.: Dent. 3rd yr. standing.

Methods and appliances for the correction of malposed teeth. Williams.

**560 P 1****Periodontics**

Su, Sp. 1 cl.

Prereq.: Dent. 3rd yr. standing.

Clinical procedures used in the treatment of periodontal disease. App.

**561 P 1****Clinical Periodontics**

Su, Sp. 3 clinic hrs.

Prereq.: Dent. 3rd yr. standing.

App.

**562 P 1****Clinical Periodontics**

A. 3 clinic hrs.

Prereq.: Dent. 3rd yr. standing.

Continuation of 561. App.

**563 P 1****Clinical Periodontics**

W. 3 clinic hrs.

Prereq.: Dent. 3rd yr. standing.

Continuation of 562. App.

**572 P 1****Pharmacology**

A. 1 cl.

Prereq.: Dent. soph. standing.

General pharmacology including the origin and methods of development of drugs; basic pharmacy involving prescription writing, the metric and apothecary systems, drug standards; and federal drug legislation and regulation. Hiatt.

**573 P 1****Pharmacology**

W. 1 cl.

Prereq.: Dent. 3rd yr. standing.

The pharmacology of drugs with possible applications to dentistry, including premedications, postmedications, and drugs affecting the autonomic nervous system. Hiatt.

**581 P 2****Complete Prosthodontics**

Su, Sp. 1 cl., 2 clinic hrs.

Prereq.: Dent. 3rd yr. standing.

The principles and practices of maxillomandibular relation records, articulating instruments and occlusion. Porter.

**582 P 3****Complete Prosthodontics**

A. 1 cl., 4 clinic hrs.

Prereq.: Dent. 3rd yr. standing.

The principles and clinical practice in the restoration of esthetics and facial expression by artificial dentures. Porter.

**583 P 3****Complete Prosthodontics**

W. 1 cl., 4 clinic hrs.

Prereq.: Dent. 3rd yr. standing.

The clinical practice of the complete denture service, including the care of patients after dentures have been inserted. Porter.

**584 P 1****Fixed Partial Prosthodontics**

Su, Sp. 1 cl.

Prereq.: Dent. 3rd yr. standing.

Veneer crowns, dowel and core, temporary coverage; diagnosis and treatment planning; electroplating; clinical applications and practice. Long.

**585 P 2****Fixed Partial Prosthodontics**

A. 1 cl., 3 clinic hrs.

Prereq.: Dent. 3rd yr. standing.

Elastic impression materials and related technics including use of gypsum products, waxes, tissue retraction, and sectioning methods; clinical applications and practice. Long.

**586 P 3****Fixed Partial Prosthodontics**

W. 1 cl., 6 clinic hrs.

Prereq.: Dent. 3rd yr. standing.

Selection of abutments and retainers, connectors and pontics; additional types of bridgework procedures; clinical applications and practice. Long.

**587 P 1****Removable Partial Prosthodontics**

Su, Sp. 1 cl.

Prereq.: Dent. 3rd yr. standing.

Complex problems of removable partial dentures and their clinical application. Heintz.

**593 P 1-15**

**Individual Studies**

Su, A, W, Sp.

Individual studies in any of the recognized fields of dentistry.

**594 P 1-6**

**Group Studies in Dentistry**

Su, A, W, Sp.

Prereq.: Dent. 1st or 2nd yr. standing.

Repeatable.

Group studies in special dental topics.

**601 P 2**

**Physical Diagnosis**

Su, Sp. 1 cl., 2 clinic hrs.

Prereq.: Dent. 4th yr. standing.

History taking; physical evaluation techniques; common laboratory analyses; nose, throat, and mouth examinations; physiology of normal and pathologic respiration, heart functions and circulation of blood. Allison, Gaston, and Wallace.

**602 P 2**

**Physical Diagnosis and Anesthesia**

A. 1 cl., 2 clinic hrs.

Prereq.: Dent. 4th yr. standing.

Oxygen and carbon dioxide transport; electrolyte and fluid balance; pharmacologic action of sedatives, hypnotics, analgesics, narcotics, intravenous barbiturates, muscle relaxants, inhalation anesthetic agents. Allison, Gaston, and Wallace.

**603 P 2**

**Anesthesia**

W. 1 cl., 2 clinic hrs.

Prereq.: Dent. 4th yr. standing.

Laryngoscopy, endotracheal intubation, maintenance of anesthesia and management during recovery; management of emergencies; use of fluids, drugs, open and closed cardiac massage techniques, and analeptics. Allison, Gaston, and Wallace.

**604 P 2**

**Oral Surgery**

Su, Sp. 1 cl., 2 clinic hrs.

Prereq.: Dent. 4th yr. standing.

Wound healing, inflammation, infection, their mechanism, diagnosis, and treatment; surgical management of exostosis, hyperplasias, and surgical preparation of the mouth for prosthodontics. Allison, Gaston, and Wallace.

**605 P 2**

**Oral Surgery**

A. 1 cl., 2 clinic hrs.

Prereq.: Dent. 4th yr. standing.

Diagnosis and surgical treatment plan for unerupted teeth; incisions, methods for removal of bone, protection for adjacent teeth, hemostatic agents, antibiotics, sutures and suturing. Allison, Gaston, and Wallace.

**606 P 2**

**Oral Surgery**

W. 1 cl., 2 clinic hrs.

Prereq.: Dent. 4th yr. standing.

Continuation of 605. Diagnosis, surgical treatment, and prognosis for pathologic conditions of the mouth and jaws, of the salivary glands and their ducts, and biopsy for lesions. Allison, Gaston, Wallace, Ford, Russell, and Snyder.

**612 P 2**

**Clinical Endodontics**

A. 4 clinic hrs.

Prereq.: Dent. 4th yr. standing.

Brilliant.

**613 P 1**

**Clinical Endodontics**

W. 2 clinic hrs.

Prereq.: Dent. 4th yr. standing.

Continuation of 612. Brilliant.

**621 P 1**

**Dental Practice Administration**

Su, Sp. 1 cl.

Prereq.: Dent. 4th yr. standing.

Dental jurisprudence; ethics and legal aspects of the practice of dentistry. Trippy, W. Postle, and Wilson.

**622 P 1**

**Dental Practice Administration**

A. 1 cl.

Prereq.: Dent. 4th yr. standing.

Dental economics, records, tax liability. Trippy, W. Postle, and Wilson.

**623 P 1**

**Dental Practice Administration**

W. 1 cl.

Prereq.: Dent. 4th yr. standing.

The social aspects of the practice of dentistry. Trippy, W. Postle, and Wilson.

**631 P 3**

**Clinical Operative Dentistry**

Su, Sp. 6 clinic hrs.

Prereq.: Dent. 4th yr. standing.

Review of the basic principles of operative dentistry and their clinical application to special problems. Beckwith and Huffman.

**632 P 3**

**Clinical Operative Dentistry**

A. 6 clinic hrs.

Prereq.: Dent. 4th yr. standing.

Introduction of special technical applications in operative dentistry and their clinical applications. Beckwith and Huffman.

**633 P 3**

**Clinical Operative Dentistry**

W. 6 clinic hrs.

Prereq.: Dent. 4th yr. standing.

Continuation of 632. Advanced theories, technical procedures, and materials in Operative Dentistry; their value, limitations, and clinical application. Beckwith and Huffman.

**641 P G 1****Advanced Oncology**

Su, Sp. 1 cl.

Prereq.: Dent. 4th yr. standing.

Dental aspects of oncology including the oral surgical, periodontic, and prosthodontic management of patients with oral neoplastic disease and post-treatment morbidity. Cavalaris.

**642 P G 1****Advanced Oncology**

A. 1 cl.

Prereq.: Dent. 4th yr. standing.

Medical aspects of oncology including the diagnosis, treatment and prognosis of cancerous problems and discussion of recent advances in cancer research and etiology. Cavalaris.

**643 P G 1****Advanced Oncology**

W. 1 cl.

Prereq.: Dent. 4th yr. standing.

Clinico-pathologic conference pertaining chiefly to neoplastic disease, particularly in the head and neck regions. Cavalaris.

**645 P 1****Clinical Oral Diagnosis and Treatment Planning**

A. 2 clinic hrs.

Prereq.: Dent. 4th yr. standing.

Blozis.

**646 P 1****Clinical Oral Diagnosis and Treatment Planning**

W. 2 clinic hrs.

Prereq.: Dent. 4th yr. standing.

Continuation of 645. Blozis.

**647 P 1****Clinical Oral Radiography**

Su, Sp. 2 clinic hrs.

Prereq.: Dent. 4th yr. standing.

O'Brien.

**648 P 1****Clinical Oral Radiography**

A. 2 clinic hrs.

Prereq.: Dent. 4th yr. standing.

Continuation of 647. O'Brien.

**649 P 1****Clinical Oral Radiography**

W. 2 clinic hrs.

Prereq.: Dent. 4th yr. standing.

Continuation of 648. O'Brien.

**651 P 2****Pedodontics**

Su, Sp. 1 cl., 3 clinic hrs.

Prereq.: Dent. 4th yr. standing.

Diagnosis of pulp conditions of primary and young permanent teeth; technics for treatment; growth and development pertaining to pedodontics; care of handicapped patients. Hall.

**652 P 1****Clinical Pedodontics**

A. 2 clinic hrs.

Prereq.: Dent. 4th yr. standing.

Hall.

**653 P 1****Clinical Pedodontics**

W. 2 clinic hrs.

Prereq.: Dent. 4th yr. standing.

Continuation of 652. Hall.

**661 P 1****Clinical Periodontics**

Su, Sp. 2 clinic hrs.

Prereq.: Dent. 4th yr. standing.

App.

**662 P 1****Clinical Periodontics**

A. 2 clinic hrs.

Prereq.: Dent. 4th yr. standing.

Continuation of 661. App.

**663 P 1****Clinical Periodontics**

W. 2 clinic hrs.

Prereq.: Dent. 4th yr. standing.

Continuation of 662. App.

**672 P 2****Pharmacology**

Su, Sp. 1 cl., 2 clinic hrs.

Prereq.: Dent. 4th yr. standing.

The chemistry, indications, actions, and effects of antibiotics and analgesics. Wallace.

**673 P 2****Pharmacology**

A. 1 cl., 2 clinic hrs.

Prereq.: Dent. 4th yr. standing.

The chemistry of tranquilizers; indications for their use and their actions; a review of prescription writing. Wallace.

**681 P 3****Complete Prosthodontics**

W. 1 cl., 4 clinic hrs.

Prereq.: Dent. 4th yr. standing.

The clinical practice of special occlusal problems, temporomandibular joint disturbances, cleft palate and surgical prosthesis. Porter.

**682 P 2****Clinical Removable Prosthodontics**

Su, Sp. 4 clinic hrs.

Prereq.: Dent. 4th yr. standing.

Porter, Heintz.

**683 P 2****Clinical Removable Prosthodontics**

A. 4 clinic hrs.

Prereq.: Dent. 4th yr. standing.

Continuation of 682. Porter, Heintz.

684 P 2

**Clinical Fixed Partial Prosthodontics**

Su, Sp. 4 clinic hrs.  
Prereq.: Dent. 4th yr. standing.  
Long.

685 P 2

**Clinical Fixed Partial Prosthodontics**

A. 4 clinic hrs.  
Prereq.: Dent. 4th yr. standing.  
Continuation of 684. Long.

686 P 2

**Clinical Fixed Partial Prosthodontics**

W. 4 clinic hrs.  
Prereq.: Dent. 4th yr. standing.  
Continuation of 685. Long.

693 P G 1-6

**Individual Studies in Dentistry**

Su, A, W, Sp. Arr.  
Prereq.: Dent. 3rd yr. standing.  
Repeatable.  
Advanced studies in any of the recognized fields of dentistry.

694 P G 1-6

**Group Studies in Dentistry**

Su, A, W, Sp. Arr.  
Prereq.: Dent. 3rd or 4th yr. standing.  
Repeatable.  
Group studies in special dental topics.

700 P G 1-15

**Special Problems**

Su, A, W, Sp.  
Prereq.: Dent. postgrad. or grad. standing.  
Repeatable.

**700.01 Advanced Oral Surgery and Anesthesia**

Diagnosis and treatment of surgical conditions of the teeth and contiguous structures; advanced techniques in surgery and local and general anesthesia. Allison and Wallace.

**700.02 Advanced Orthodontics**

Applied osteology and myology in cephalometric roentgenographic interpretations; review of cephalic growth and development factors in normal occlusion; correction of malocclusions and dento-facial malformations. Williams and Wade.

**700.03 Advanced Periodontics**

Diagnosis and treatment of periodontal disease; correlation between the disease of the periodontium and probable systemic diseases, and management of diseases of a purely dental origin. App, Solt.

**700.04 Advanced Prosthodontics**

The diagnosis, treatment, and replacement of missing or lost teeth and parts of the mouth by prosthetic appliances; complete removable partial, or fixed restorations. Boucher, Heintz, Long, and Woelfel.

**700.05 Advanced Oral Pathology and Diagnosis**

The interrelationships of gross microscopic, and clinical pathology; current advances in the field of oral pathology and diagnosis. Cavalaris, Blozis.

**700.06 Advanced Endodontics**

The diagnosis of pulp and periapical diseases and their treatment by surgical and non-surgical techniques.

**700.07 Advanced Pedodontics**

Lectures, seminars and clinical practice encompassing all phases of pedodontics and interceptive orthodontics.

**700.08 Advanced Dental Materials**

The science of dental materials. McConnell.

**700.09 Advanced Oral Histology and Embryology**

The principles of histology and embryology applied to the structures in the oral region—their development, morphology, functions, and clinical relationships. Melfi.

**700.10 Advanced Operative Dentistry**

Clinical problems in operative dentistry and their correlation with problems in related fields of dentistry; special emphasis on preventive dentistry. Wilson.

785 P G 1-5

**Histologic Laboratory Technique**

Su, A, W, Sp.  
Prereq.: Permission of instructor.  
The preparation of oral and dental tissues for microscopic study. Permar.

786 P G 3-5

**Research Methods in Dentistry**

Su, A, W, Sp.  
Prereq.: Permission of instructor.  
Repeatable.  
A discussion on conceptual, methodological, and technical problems encountered in development of dental research projects.

792 P G 3-5

**Special Lectures in Dentistry**

Su, A, W, Sp. Arr.  
Prereq.: Permission of instructor.  
Repeatable.  
Lectures in special phases in dentistry.

**792.01 Oral Pathology**

General principals and concepts of pathology associated with the oral cavity.

**792.02 Oral Pathology**

Local disturbances of the oral cavity.

**792.03 Oral Pathology**

Systemic disturbances and their oral manifestations.

**792.04 Dental Radiology**

Radiologic methods and diagnosis.

**792.05 Oral Diagnosis**

Examination and diagnosis of oral disease.

**792.06 Dental Therapeutics**

Principals of pharmacology in relation to patient care.

**792.07 Physical Diagnosis**

Physical evaluation of the dental patient and its correlation with the required treatment.

**792.08 Dental Epidemiology**

The principals of epidemiology in relation to dental health and disease.

**793 P G 3-5****Individual Studies**

Su, A, W, Sp. Arr.

Prereq.: Permission of instructor.

Repeatable.

Individual assignments in each specialty of dentistry; students will elect to work in desired subjects after a conference with the instructor in charge.

- 793.01 Oral Surgery and Anesthesia
- 793.02 Orthodontics
- 793.03 Periodontics
- 793.04 Prosthodontics
- 793.05 Oral Pathology
- 793.06 Endodontics
- 793.07 Pedodontics
- 793.08 Operative Dentistry
- 793.09 Oral Diagnosis
- 793.10 Fixed Partial Prosthodontics
- 793.11 Oral Radiography

**794 P G 3-5****Group Studies**

Su, A, W, Sp. Arr.

Prereq.: Permission of instructor.

Repeatable.

Group studies on special problems in each specialty of dentistry.

- 794.01 Oral Surgery and Anesthesia
- 794.02 Orthodontics
- 794.03 Periodontics
- 794.04 Prosthodontics
- 794.05 Oral Pathology
- 794.06 Endodontics
- 794.07 Pedodontics
- 794.08 Operative Dentistry
- 794.09 Oral Diagnosis
- 794.10 Fixed Partial Prosthodontics
- 794.11 Oral Radiography

**795 P G 1****Seminar in Dentistry**

A, W, Sp. 1 cl.

Prereq.: Dent. grad. standing.

A discussion of recent advances in all branches of dental science; review of original literature. Conroy, Foreman, and Melfi.

**796 P G 3-5****Specialty Seminars in Dentistry**

Su, A, W, Sp. Arr.

Prereq.: Permission of instructor.

Repeatable.

Seminars in each of the specialty areas of dentistry for discussion of pertinent literature, presentation, and discussion of research work, and demonstration of advanced techniques.

- 796.01 Oral Surgery and Anesthesia
- 796.02 Orthodontics
- 796.03 Periodontics
- 796.04 Prosthodontics
- 796.05 Oral Pathology
- 796.06 Endodontics
- 796.07 Pedodontics
- 796.08 Operative Dentistry
- 796.09 Oral Diagnosis
- 796.10 Fixed Partial Prosthodontics
- 796.11 Oral Radiography

**798 P 3-10****Advanced Clinical Practice in Dentistry**

Su, A, W, Sp. Arr.

Prereq.: Permission of instructor.

Repeatable to maximum of 120 cr. hrs.

Broad exposure to advanced principals and practices in each specialty of dentistry.

- 798.01 Oral Surgery and Anesthesia
- 798.02 Orthodontics
- 798.03 Periodontics
- 798.04 Prosthodontics
- 798.05 Oral Pathology
- 798.06 Endodontics
- 798.07 Pedodontics
- 798.08 Operative Dentistry
- 798.09 Oral Diagnosis
- 798.10 Fixed Partial Prosthodontics
- 798.11 Oral Radiography

**993 G 3-5****Individual Studies**

Su, A, W, Sp. Arr.

Prereq.: Permission of instructor.

Repeatable.

Advanced individual studies in dentistry.

**994 G 3-5****Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable.

Advanced group studies in dentistry.

**999 G Arr.****Research in Dentistry**

Su, A, W, Sp.

Research for thesis purposes only.

## Design

Office: 374 Hopkins Hall, 128 North Oval Drive

**Professors** Wallschlaeger (Chairman), Wood, and Zimmer **Associate Professor** Butter; **Assistant Professors** Bonner, Gysler, Jones, Lineback, Megert, and Rheinfrank.

**160 U 3****Introduction to Industrial Design**

A, W, Sp. 3 cl.

Prereq.: Permission of Chairman.

Not open to juniors or seniors in industrial design.

Introduction to the rationale of design and systematic design processes; an overview of the profession of industrial design; an introduction to the Division's educational program.



**250 U 3****Studies in Industrial Design**

A. 3 2-hr. labs.

Prereq.: Permission of instructor.

Studies in specified areas in the field of industrial design, with emphasis on particular aspects of product, visual communication, and space and enclosure design problems.

**251 U 5****Industrial Design I**

A. 5 3-hr. labs.

Prereq.: Design majors.

Introduction to the theories, methods, and practices of industrial design with primary emphasis on basic visual language and visual encoding practices.

**252 U 5****Industrial Design I**

W. 5 3-hr. labs.

Prereq.: 251.

A continuation of 251; primary emphasis on the planning practices of problem delineation and preliminary designing; secondary emphasis on researching and encoding.

**253****Industrial Design I****253.01 Industrial Design Theory****U 3**

Sp. 9 lab. hrs.

Prereq.: 252; concur. 253.03.

Not open to students with credit for 253.

A history of industrial design and a survey of manufacturing practices as they influence the industrial design profession.

**253.03 Industrial Design Practices****U 2**

Sp. 6 lab. hrs.

Prereq.: 252; concur. 253.01.

Not open to students with credit for 253.

Application of photographic knowledge, skills, and techniques as utilized by the industrial designer in various stages of design.

**258 U 3****Typography**

A, W, Sp. 3 2-hr. labs.

Open only to majors in industrial design and art education or by permission of instructor.

Introduction to the knowledge and skills of typographical design and its corresponding aesthetic, functional, and technological applications and utilizations.

**294 U 1-5****Group Studies**

A, W, Sp. Lec./lab.

Prereq.: Permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

Group studies for special topics in industrial design.

**450 U 5****Industrial Design II**

A. 5 2-hr. labs.

**450.02 Visual Communication Design**

Prereq.: 253.01, 253.03 or permission of instructor; concur. 460.02.

Not open to students with credit for 450.

Visual communication practices with primary emphasis on problem delineation, information and data collection, analysis, synthesis, and evaluation.

**450.04 Product Design**

Prereq.: 253.01, 253.03 or permission of instructor; concur. 460.04.

Not open to students with credit for 450.

Study of the systems and factors of product design, including materials and human factors; emphasis on problem delineation, preliminary design, data and information collection and analysis.

**450.08 Space and Enclosure Design**

Prereq.: 253.01, 253.03 or permission of instructor; concur. 460.08.

Not open to students with credit for 450.

Introduction to advanced methods of design inquiry organization, information analysis, and decision-making techniques, including general systems theory as utilized to design enclosed spatial systems.

**451 U 5****Industrial Design II**

W. 5 2-hr. labs.

**451.02 Visual Communication Design**

Prereq.: 450.02, 460.02; concur. 461.02.

Not open to students with credit for 451.

Study and practice of processing information and data with primary emphasis on encoding, detail designing, and specifying the design production.

**451.04 Product Design**

Prereq.: 450.04, 460.04; concur. 461.04.

Not open to students with credit for 451.

Study of the materials and production processes of product design, with emphasis on information and data analysis, performance specification, and preliminary design.

**451.08 Space and Enclosure Design**

Prereq.: 450.08, 460.08; concur. 461.08.

Not open to students with credit for 451.

Study of material manufacturing processes, and material technology as utilized in the fabrication of mass-produced spatial enclosures.

**452 U 5****Industrial Design II**

Sp. 5 2-hr. labs.

**452.02 Visual Communication Design**

Prereq.: 451.02, 461.02; concur. 462.02.

Not open to students with credit for 452.

Study of visual communication practices with primary emphasis on decoding, production methods, techniques, and their applications.

**452.04 Product Design**

Prereq.: 451.04, 461.04; concur. 462.04.

Not open to students with credit for 452.

Study of human factors involved in product design and evaluation; continued study of design processes, with secondary emphasis on detail design and production specification.

**452.08 Space and Enclosure Design**

Prereq.: 451.08, 461.08; concur. 462.08.

Not open to students with credit for 452.

Introduction to the principles of structural design and analysis as applicable to the forms and shapes utilized to create spatial compartments and aggregations of compartments.

**460 U 5****Industrial Design II**

A. 5 2-hr. labs.

**460.02 Visual Communication Design**

Prereq.: 253.01, 253.04; concur. 450.02.

Not open to students with credit for 460.

Application of, and experimentation with, a variety of materials, processes, and techniques (as directed in 450.02) available for use by the visual communicator.

**460.04 Product Design**

Prereq.: 253.01, 253.03; concur. 450.04.

Not open to students with credit for 460.

Study of product design planning and information and data processing techniques; primary emphasis on visualization, communication techniques, and encoding.

**460.08 Space and Enclosure Design**

Prereq.: 253.01, 253.03 and Compu. and Info. Sc. 240 or 241 or Engr. Graphics 200.

Not open to students with credit for 461.

Application of research, planning, and decision-making techniques for the design of space enclosure systems; utilization of computer applications available to the designer.

**461 U 5****Industrial Design II**

W. 5 2-hr. labs.

**461.02 Visual Communication Design**

Prereq.: 450.02, 460.02; concur. 451.02.

Not open to students with credit for 461.

Study of selected practices in encoding and transmitting the communicative act or product (as directed in 451.02).

**461.04 Product Design**

Prereq.: 450.04, 460.04; concur. 451.04.

Not open to students with credit for 461.

Application of the knowledge of materials and production processes to product design, with primary emphasis on performance specifications and preliminary design techniques.

**461.08 Space and Enclosure Design**

Prereq.: 450.08, 460.08; concur. 451.08.

Not open to students with credit for 461.

Introduction to the fundamental principles of designing interior environments and equipment: lighting, power distribution, heating and cooling systems, interior transport, acoustics, and sound systems.

**462 U 5****Industrial Design II**

Sp. 5 2-hr. labs.

**462.02 Visual Communication Design**

Prereq.: 451.02, 461.02; concur. 452.02.

Not open to students with credit for 462.

Study and simulation of the interaction of management, personnel, and production practices as employed in the development of a communication product

**462.04 Product Design**

Prereq.: 451.04, 461.04; concur. 452.04.

Not open to students with credit for 462.

Application of preliminary and detailed design procedures and production specification, with primary emphasis on an integration of materials and human factors.

**462.08 Space and Enclosure Design**

Sp. 5 2-hr. labs.

Prereq.: 451.08 and 461.08; concur. 452.08.

Study of the principles of space lattice development and packing cell geometry applicable to space and enclosure systems.

**594 U G 1-5****Group Studies**

A, W, Sp. Lec./lab.

Prereq.: Permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

Group studies for special topics in industrial design.

**653 U G 4****Space Enclosure Systems**

Sp. 1 cl., 3 lab. hrs.

Prereq.: Senior or grad. standing, permission of instructor.

Repeatable to a maximum of 12 cr. hrs.

Studies in space lattice development and variables of form and proportion of packing cells directed toward application in packaging, space frames, partitioning, and compartment design.

**660 U G 5****Industrial Design III****660.02 Visual Communication Design**

A. 5 2-hr. labs.

Prereq.: 452.02 or 462.02; concur. 694.02 for 5 cr. hrs.

Not open to students with credit for 665.

Advanced study of the encoding, transmitting, production, and diffusion practices of visual communication design.

**660.04 Product Design**

A. 5 2-hr. labs.

Prereq.: 452.04 and 462.04; concur.: 694.04 for 4 cr. hrs.

Not open to students with credit for 660.

Application of advanced decision-making techniques to complex product systems with consideration of factor areas in technology and human engineering.

**660.08 Space and Enclosure Design**

A. 5 2-hr. labs.

Prereq.: 452.08 and 462.08; concur. 694.08 for 4 cr. hrs.

Application of space organization planning and advanced decision-making techniques to the design of enclosed spaces and mass-produced enclosure systems with emphasis on available computer software.

**661 U G 5****Industrial Design III****661.02 Visual Communication Design**

W. 5 2-hr. labs.

Prereq.: 660.02; concur. 694.02 for 5 cr. hrs.

Not open to students with credit for 666.

An in-depth study of selected visual communication design concepts and practices as applied to the development of communication products and product systems.

**661.04 Product Design**

W. 5 2-hr. labs.

Prereq.: 660.04; concur. 694.04 for 4 cr. hrs.

Not open to students with credit for 661.

The extended application of product system design concepts, emphasizing detail design, managed production systems, and design solution diffusion.

**661.08 Space and Enclosure Design**

W. 5 2-hr. labs.

Prereq.: 660.08 concur. 694.08 for 4 cr. hrs. or permission of instructor.

Study of advanced manufacturing and environmental principles utilized in mass-produced enclosure systems and system interfaces.

**662 U G 5****Industrial Design III****662.02 Visual Communication Design**

Sp. 5 2-hr. labs.

Prereq.: 661.02; concur. 694.02 for 5 cr. hrs.

Not open to students with credit for 667.

Continuation of applied practice in professional visual communication emphasizing communication, systematic planning, and manufacturing.

**662.04 Product Design**

Sp. 5 2-hr. labs.

Prereq.: 661.04; concur. 694.04 for 4 cr. hrs.

Not open to students with credit for 662.

Continuation of applied practice in professional product design problems, emphasizing communication, systematic planning, and manufacturing.

**662.08 Space and Enclosure Design**

Sp. 5 2-hr. labs.

Prereq.: 661.08; concur. 694.08 for 4 cr. hrs.

Intensive application of space enclosure design methods and techniques applied to a complex simulated professional problem; seminars investigating aspects of the industrial design professional practice.

**693 U G 2-5****Individual Studies**

Prereq.: Permission of instructor.

Each decimal subdivision repeatable to a maximum of 45 cr. hrs.

Advanced study for students in specialized programs.

**693.02 Visual Communication Design**

A, W, Sp.

**693.04 Design**

Su, A, W, Sp.

**693.08 Space and Enclosure Design**

Su, A, W, Sp.

**694 U G 2-5****Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Each decimal subdivision repeatable to a maximum of 15 cr. hrs.

Group studies for students in specialized programs.

**694.02 Visual Communication Design****694.04 Design****694.08 Space and Enclosure Design****698 U G 5-15****Study Tour in Design**

Su, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

First-hand knowledge of design practice, designers and cultural environment abroad with meetings, discussion, observations, documentation concerning aspects of international product and visual communication design.

**794 U G 1-5****Group Studies**

Su, A, W, Sp. Lec./lab.

Prereq.: Permission of instructor.

Repeatable to a maximum of 30 cr. hrs.

Group studies for special topics in industrial design.

**797 U G 1-5****Interdepartmental Seminar**

A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Interdisciplinary knowledge and problems examined and discussed in the context of shared concerns.

**899 G 1-5****Interdepartmental Seminar**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Interdisciplinary knowledge and problems examined and discussed in the context of shared concerns.

**950 G 3-5****Research Problems in Design**

A, W, Sp.

Repeatable to maximum of 45 cr. hrs.

**993 G 1-5****Individual Studies**

A, W, Sp.

Repeatable to a maximum of 45 cr. hrs.

**994 G 1-5****Group Studies**

A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Group studies for students in specialized programs.

**998 G Arr.****Research in Design: Thesis**

A, W, Sp.

Research for thesis purposes only.

## Developmental Biology

**999 G Arr.****Research in Developmental Biology**

Su, A, W, Sp.

Research for thesis and dissertation purposes only.

## Economics

Office: 239 Hagerty Hall, 1775 College Road

**Professors** Cunnyngham (Chairman), Craig, Dewald, Eason, Fleisher, Hogan, Kane, Kelley, L'Esperance, Lynn, Oakland, Oster, Parnes, Quantius, Sandberg, Sherman, Stocker, Swamy, and Tybout; **Associate Professors** Baltensperger, Boyd, Brito, Koizumi, Kumar, McCalmont, Michael, and Weicher; **Assistant Professors** Adams, Baack, Barnekov, Borukhov, Brada, Caswell, Cox, Darby, Finn, Hatta, Hong, Kopecky, Mattila, Parsons, Ray, Shapiro, Sharma, Singh, Tarr, and Wipf; **Lecturer** Parsons.

The Department of Economics offers opportunities for special study in the following fields:

Economic Theory and History of Thought  
Economic History  
Money, Banking, and Monetary Policy  
Government Finance and Expenditure  
Econometrics  
Economic Development and Development Planning  
International Economics  
Structure and Regulation of Industry  
Labor Economics  
National Security Economics  
Soviet Economy  
Mathematical Economics

### 200 U 5 Principles of Economics I

Su, A, W, Sp. 5 cl.

H200 (Honors) may be available to students enrolled in a College Honors Program or by permission of dept.

Recommended first course for students who plan to take more than one course in economics.

Not open to students with credit for 201 or 402.

Introduction to economic theory: supply and demand for goods and services; market structure; the distribution of income.

### 201 U 5 The Economic System

Su, A, W, Sp. 5 cl.

Not recommended for students who plan to take more than one course in economics.

Not open to students with credit for 200 or 400.

Study of basic characteristics, processes, and institutions of the economic system; significant problems arising in its operations; proposed solutions.

### 400 U 5 Principles of Economics II

Su, A, W, Sp. 5 cl.

H400 (Honors) may be available to students enrolled in a College Honors Program or by permission of dept.

Prereq.: 200.

Not open to students with credit for 201 or 402.

Continuation of 200; theory of national income determination; economic fluctuations; money; government policy; international economics.

### 402 U 5 Introduction to Economic Theory

A, W, Sp. 5 cl.

Prereq.: 201 or equiv.

Not open to students with credit for 200 or 400.

Introduction to economic analysis, including the theory of the market; supply, demand, and price determination; income distribution; aggregate income and employment determination.

### 442 U 5 Elementary Economic Statistics

Su, A, W, Sp. 4 cl., 2 1-hr. lab.

Prereq.: Completion of Math. requirement in college of student's registration, or Math. 116 and 117 where there is no college Math. requirement.

Discrete frequency distributions; probability and probability distributions; statistical inference including the Bayesian approach; estimation; one-way analysis of variance; simple linear regression and correlation; index numbers.

### 490 U 4 Economics of the Ghetto

W. 4 cl.

Prereq.: 200 or 201.

Interaction between economic problems and race problems in urban areas. Weicher.

### 494 U 5 Group Studies

Su, A, W, Sp. 5 cl.

Prereq.: 201 or equiv.

Repeatable to a maximum of 15 cr. hrs.

Application of economic analysis of scarcity and choice to special topics of current policy significance.

### 500 U G 4 Evolution of Economic Thought

Sp. 4 cl.

Prereq.: Either 400, 402 or equiv.

Critical analysis of ideas of great economists, factors which influenced those ideas; their impact upon social and economic development of the modern world. Michael.

### 501 U G 4 Intermediate Micro-Economic Theory

Su, A, W, Sp. 4 cl.

Prereq.: Either 400, 402 or equiv.

Theory of consumer behavior; theory of the firm; costs and production; factor price determination; general equilibrium.

### 502 U G 4 Intermediate Macro-Economic Theory

Su, A, W, Sp. 4 cl.

Prereq.: Either 400, 402 or equiv.; 501 recommended.

Analysis of the determinants of national output, income and employment levels; theory of economic growth and progressive equilibrium in an economy.

### 506† U G 3 Current Economic Problems

W. 3 cl.

Prereq.: Either 400, 402 or equiv.

Not open to undergrad. and grad. students majoring in Econ.

Examination of current problems; optimum levels of employment; conditions underlying consumer expenditures; savings, investments; inflation, deflation; agriculture, public works, housing; regional development.

**508 U G 4****Comparative Economic Systems**

W. 4 cl.

Prereq.: Either 400, 402 or equiv.

Not recommended for students who plan to take 607 and not open to students with credit for 690.

Principles and institutions for economic decision making under capitalism, socialism, communism, and "mixed" systems; comparison of selected countries. Brada and Eason.

**512 U G 4****General Economic History**

Su, A, Sp. 4 cl.

Prereq.: Either 400, 402 or equiv.

Evolving institutional changes fundamental to Western development; analysis of the rise of nation-state, commercial and industrial development, and evolution of a market economy. Baack and Sandberg.

**520 U G 4****Money and Banking**

Su, A, W, Sp. 4 cl.

H520 (Honors) may be available to students enrolled in a College Honors Program or by permission of dept.

Prereq.: Either 400, 402 or equiv.

Not open to graduate students in Econ.

Organization, operation, and economic significance of our monetary and banking system are discussed with special reference to current conditions and problems.

**530 U G 4****Government Finance in the American Economy**

Su, A, W, Sp. 4 cl.

H530 (Honors) may be available to students enrolled in a College Honors Program or by permission of dept.

Prereq.: Either 400, 402 or equiv.

Not open to graduate students in Econ.

Analysis of fiscal institutions and decision making in the public sector of the American economy; budget planning and execution; taxation, debt, fiscal policy.

**550 U G 4****Economic Development**

A. 4 cl.

Prereq.: Either 400, 402 or equiv.

Not open to students with credit for 610 or 650.

Empirical and theoretical consideration of long-term economic changes, including changes in industrial structure, technology, and level of national product; emphasis on developing economics. Michael, Kelley, and Singh.

**553 U G 3****Population**

Sp. 3 cl.

Prereq.: Either 400, 402 or equiv.

Techniques of population analysis; the demographic transition and economic theories of population; impact of population change both in the Third World and in industrialized nations. Eason and Shapiro.

**558 U G 4****Economic Development of Latin America**

W. 4 cl.

Prereq.: Either 400, 402, or equiv.

Regional analysis of economic conditions in Latin America and prospects for accelerated economic growth; evaluation of national development strategies and current programs of inter-regional cooperation. Finn and Kelley.

**559 U G 4****Economic Development of the Soviet Union and Eastern Europe**

Sp. 4 cl.

Prereq.: 400 or 402; 508 or 550 recommended.

Not recommended for students planning to take 608.

Measurement and interpretation of economic performance in the Soviet Union and Eastern Europe; resource development and utilization; international economic relations; strategy for economic growth. Brada and Eason.

**560 U G 4****International Economic Relations**

W, Sp. 4 cl.

Prereq.: Either 400, 402 or equiv.

Not recommended for students who plan to take 665 and 666.

Survey of international economic relations; the basis of world trade; commercial and financial policy, particularly of the United States; and recent international economic organization. Michael and Wipf.

**563† U G 4****Economic Problems of Western Europe**

A. 4 cl.

Prereq.: Either 400, 402 or equiv.

Not open to students with credit for 663.

European reconstruction; European Economic Community and the Free Trade Area; implications.

**570 U G 4****Government and Business**

Su, A, Sp. 4 cl.

Prereq.: Either 400, 402 or equiv.

Economics and legal aspects of Government regulation of business in the United States; philosophies and concepts of public control; contemporary problems. Barnekov, Boyd, and Cox.

**576 U G 4****Transportation Economics**

W. 4 cl.

Prereq.: Either 400, 402 or equiv.

Not open to students with credit for 676.

Study of general economic characteristics and government regulation of rail, motor, water, air, and pipeline carriers; consideration of competitive relations between modes of transportation. Barnekov and Boyd.

**577 U G 4****Transportation Planning and Coordination**

Sp. 4 cl.

Prereq.: 576 or permission of instructor.

Not open to students with credit for 677.

Transportation, local development, and industrial location; criteria for public investment in highway, airport, and other transportation facilities. Boyd and Tybout.

**580 U G 4****Labor Economics and Industrial Relations**

Su, A, W, Sp. 4 cl.

H580 (Honors) may be available to students enrolled in a College Honors Program or by permission of dept.

Prereq.: Either 400, 402 or equiv.

Not open to graduate students in Econ.

Survey of the field of labor economics; trade unionism, collective bargaining; wage determination, employment, unemployment; labor legislation.

**581 U G 4****Economics of the Labor Market**

Sp. 4 cl.

Prereq.: 580 or equiv.

Materials and methods of labor market analysis; the measurement and behavior of unemployment, employers' and employees' labor market behavior; wage determination and labor allocation. Parnes.

**H599 U 1-15****Honors Course**

Su, A, W, Sp.

Open only to students enrolled in the Honors Program of the Colleges of the Arts and Sciences or the College of Administrative Science.

Repeatable to a maximum of 15 cr. hrs., but must be taken for at least 2 qtrs.

Program of readings, conferences, and reports arranged for the student who is a candidate for "Degree with Distinction" in Economics.

**600 U G 5****Applications of Mathematics in Economic Analysis**

A, W, Sp. 5 cl.

Prereq.: Math. 152 or equiv. and permission of instructor.

Coverage of the most common applications of mathematics to economic analysis and econometrics; the necessary tools from matrix algebra and calculus are provided.

**607 U G 4****Economics of Socialism**

A. 4 cl.

Prereq.: 501 and 502 or equiv.

Survey of socialist thought and movements; relations of socialist thought to the theory and practice of socialist economics; planning, allocation, pricing, and controls. Brada and Eason.

**608 U G 4****Economic Analysis of the Soviet Union and Eastern Europe**

Sp. 4 cl.

Prereq.: 501 and 502 or equiv.

Not open to students with credit for 698.

Analysis of the pattern of economic growth and theory, and practice of economic planning in the Soviet Union and Eastern Europe; comparison with Communist China. Eason.

**613 U G 4****Economic History of the United States**

W. 4 cl.

Prereq.: 501, 502, and 512.

General survey from discovery of America to present; European economic background; westward movement and its effects; development of economic institutions in the U. S. Baack.

**614 U G 4****Economic History of Western Europe**

A. 4 cl.

Prereq.: 501 and 502.

Survey from 1750 through the post-World War II period; coverage will go from Britain in the West to Russia in the East. Sandburg.

**625 U G 4****National and International Money Markets**

A. 4 cl.

Prereq.: 501 and 520.

Organization, functions, and control of money markets and their submarkets; flow of funds in these markets and investment policies of market participants. Baltensperger and Quantius.

**631 U G 4****Federal Finance and Fiscal Policy**

A. 4 cl.

Prereq.: 501, 502, and 530; or grad. standing in Econ.

Not open to students with credit for 630.

The economics of government spending and taxation; analysis of the fiscal role and instruments of government and their effects on the economy. Lynn.

**632 U G 4****Government Budgeting and Expenditure Criteria**

W. 4 cl.

Prereq.: 501, 502, and 530; or grad. standing in Econ.

Analyses of various economic criteria for efficient decision making in the budgeting process; the various types of budgets and their relationship to efficient expenditure policy. Tybout.

**633 U G 4****State-Local Government Finance**

Sp. 4 cl.

Prereq.: 501, 502, and 530; or grad. standing in Econ.

Economic analysis of revenues and expenditures of state and local governments; vertical and horizontal relationships between agencies and units; specific problems in these areas. Stocker.

**640 U G 4****Probability and Statistical Decision Theory**

Su, W. 4 cl.

Prereq.: 400 or 402, and 442 or equiv.

Theory of probability and stochastic processes; statistical inference, tests of significance and analysis of variance; statistical decision theory. Cunyngham, Kane, L'Esperance, and Swamy.

**641 U G 4****Applied Regression and Correlation Analysis**

The general linear regression model; matrix algebra; multiple correlation, analysis of variance and tests of significance; specification errors. Cunyngham, L'Esperance, Kane, and Swamy.

**641.01 Regression Analysis I**

A, Sp. 4 cl.

Prereq.: 400 or 402, and 442 or equiv.

Not open to students with credit for 641 or 641.02.

**641.02 Regression Analysis II**

Sp. 4 cl.

Prereq.: 600 and 640.

Not open to students with credit for 641 or 641.01.

**645† U G 4****Linear Programming and Economic Analysis**

W. 4 cl.

Prereq.: 501 and 600.

Techniques of linear programming and input-output analysis applied to economic problems of allocation and valuation within the firm and the economy.

**652 U G 4****Development Planning**

W. 4 cl.

Prereq.: 502 and 550.

Analysis of the economics of planning and its major applications to private and public planning; procedures and techniques of development planning. Kelley, Michael, and Singh.

**665 U G 5****International Trade and Finance**

W. 5 cl.

Prereq.: 501 or 502; and 520.

Specialized production, comparative cost and advantages, and the gains from trade; international payments and receipts, possible equilibrium; balance-of-payments adjustments under different monetary systems; reforms. Wipf.

**666 U G 3****International Commercial Policy**

Sp. 3 cl.

Prereq.: 665.

Tariffs and other trade restrictions; economic effects of protective tariffs; regional economic integration; U. S. commercial policies; multilateral tariff reductions of America and Common Market. Wipf.

**670 U G 4****Competition and Public Policy**

W. 4 cl.

Prereq.: 501 and 570.

Nature, role, and regulation of competition; market structure and social performance; antitrust laws; current economic, legal, and policy problems in the antitrust area. Parsons.

**683 U G 4****Unions and Collective Bargaining**

A. 4 cl.

Prereq.: 580 plus 1 other 500-level course in Econ.

Development of unionism in the United States; structure and government of contemporary labor organizations; collective bargaining; settlement of labor-management disputes. Parnes.

**684 U G 4****Labor and the Government**

W. 4 cl.

Prereq.: 580 plus 1 other 500-level course in Econ.

Public policy with respect to labor problems and industrial relations; role of legislative, judicial, and executive branches of state and federal governments. Shapiro.

**692 U G 4****Urban Economics**

Sp. 4 cl.

Prereq.: 501 and 530.

Application of economic theory to urban problems; topics include slums, residential segregation, intracity location of economic activity, urban renewal, urban sprawl, transportation, and governmental organization. Borukhov and Weicher.

**693 U G 1-5****Individual Studies**

Su, A, W, Sp.

Advanced readings in Econ. and related fields. Juniors registered for 693 must have an average of B or better in all Econ. courses; and a cumulative point-hour ratio of 3.0 or better.

Repeatable to a maximum of 15 cr. hrs. in any combination of decimal subdivisions.

**693.01 Economic Theory and History of Thought****693.02 Economic History****693.03 Money, Banking, and Monetary Policy****693.04 Government Finance and Expenditure****693.05 Econometrics****693.06 Economic Development and Development Planning****693.07 International Economics****693.08 Structure and Regulation of Industry****693.09 Labor Economics****693.10 National Security Economics****693.11 Soviet Economy****693.12 Mathematical Economics****694 U G 3-5****Group Studies**

A, W, Sp.

Each decimal subdivision repeatable to a maximum of 15 cr. hrs.

Advanced courses in economics and related fields.

**694.01 Economic Theory and History of Thought****694.02 Economic History****694.03 Money, Banking, and Monetary Policy****694.04 Government Finance and Expenditure****694.05 Econometrics****694.06 Economic Development and Development Planning****694.07 International Economics****694.08 Structure and Regulation of Industry****694.09 Labor Economics****694.10 National Security Economics****694.11 Soviet Economy****694.12 Mathematical Economics****695 U G 4****Economics of National Security**

A. 4 cl.

Prereq.: Any 2 of 501, 502, 530, 560, 670.

Not open to students with credit for 679.

Analysis of economics problems arising from defense and war; emphasis on implication of defense and war economy and on economic theory and institutions. Sherman.

**Introduction to National Security**

(See Nat. Sec. Pol. S. 702.)

**705 U G 4****Micro-Economic Theory Survey**

A. 4 cl.

Prereq.: Grad. standing or permission of instructor.

May be available to students enrolled in a College Honors Program.

Not open to students with credit for 501.

Theory of consumer behavior; theory of the firm; costs and production; factor price determination; general equilibrium.

**706 U G 4****Macro-Economic Theory Survey**

W. 4 cl.

Prereq.: Grad. standing or permission of instructor.

May be available to students enrolled in a College Honors Program.

Not open to students with credit for 502.

Analysis of the determinants of the national output; income and employment levels; theory of economic growth and progressive equilibrium in an economy.

**742 U G 4****Econometrics**

A. 4 cl.

Prereq.: 641 or equiv.

Review of the general linear model; identification; estimating criteria; single and simultaneous equation estimation; econometric application. Cunyngnam, L'Esperance, and Swamy.

**Research Principles and Techniques in National Security**

(See Nat. Sec. Pol. S. 785.)

**800 G 3****Research Methods in Economics**

A.

Methods of economic research, choice of research topics, and presentation and evaluation of results obtained. Cunyngnam.

**Seminar in National Security Research**

(See Nat. Sec. Pol. S. 801.)

**802 G 4****History of Economic Thought**

Sp.

A survey of economic thought with emphasis on the period from Adam Smith to the present. Lynn.

**805 G 5****Micro-Economic Theory**

Su, A, W, Sp.

Prereq.: 501; prereq. or concur. 600.

Nature of economic analysis; theory of demand, costs, and prices; factor price determination and functional income distribution; competition, oligopoly, monopoly, and monopsony.

**806 G 5****Macro-Economic Theory**

A, W, Sp.

Prereq.: 502; prereq. or concur. 600.

Theory of income and employment; Keynesian aggregate supply and demand; consumption, saving, and the multiplier; determinants of investment and the accelerator; government's role.

**808 G 5****Advanced Micro-Economic Theory**

Sp.

Prereq.: 600, 805, and 806.

Koizumi and Tarr.

**809 G 5****Advanced Macro-Economic Theory**

W.

Prereq.: 600, 805, and 806.

Baltensperger and Brito.

**815 G 4****Mathematical Economics I**

A.

Prereq.: 645, 808, and permission of instructor.

Mathematical analysis of microeconomic problems including consumer and production theory and general equilibrium. Koizumi.

**816 G 4****Mathematical Economics II**

W.

Prereq.: 645, 809, and permission of instructor.

Mathematical analysis of macro-economic problems including static and dynamic systems and optimal control. Tarr.

**820 G 4****Monetary Theory**

Su, W.

Prereq.: 520, 805, and 806 or equiv.

Role of money in theoretical analysis of forces determining and influencing level of income, employment, and prices. Dewald and Kane.

**821 G 4****Bank Structure and Regulation**

Sp.

Prereq.: 520, 805, and 806 or equiv.

Relation of bank regulation and supervision to composition of banking industry; impact of differing banking structures on economic growth and stability; proposals for structural changes. Baltensperger.

**831 G 3****Legal and Economic Problems in Taxation**

Sp.

Legal, economic, and administrative problems in taxation. Lynn.

**842 G 4****Advanced Econometrics**

W.

Prereq.: 742.

Theory and application of advanced quantitative research methods; computerized application of econometric methods developed in 742. Cunyngnam, L'Esperance, and Swamy.



**843 G 3**  
**General Business Conditions Analysis**

A, W, Sp.

Prereq.: 402 and enrollment in the MBA program.

Theoretical and applied analysis of general economic conditions and their relation to decisions of the firm. Brada, Hogan, Kopecky, and L'Esperance.

**844 G 3**  
**Managerial Economics**

A, W, Sp. 2 1½-hr. cl.

Prereq.: 402, Math. 122, and enrollment in the MBA program.

MBA core course in micro-economics; production and consumer theory, market forms, welfare, distribution, general equilibrium, and capital theory. Brada, Hogan, and Tarr.

**850 G 4**  
**Advanced Economic Development I**

W.

Prereq. or concur.: 805 and 806.

Not open to students with 6 cr. hrs. in 810.

A survey of the problems of economic development with emphasis on theoretical understanding of underdevelopment and its causes. Singh.

**851 G 4**  
**Advanced Economic Development II**

Sp.

Prereq.: 805, 806, and 850.

The problems of measurement and estimation in underdeveloped economies with special reference to policy issues and development planning. Michael.

**861 G 4**  
**Advanced Micro-Economic Trade Theory**

A. 4 cl.

Prereq.: 805.

Advanced nonmonetary international trade theory; analysis of the effect of trade and commercial policies on the allocation of resources, income distribution, and growth. Ray and Wipf.

**862 G 4**  
**Advanced Macro-Economic Trade Theory**

W.

Prereq.: 805 and 806; 861 recommended.

Advanced monetary international trade theory; analysis of payments adjustments under alternative international monetary institutions. Ray and Wipf.

**872 G 4**  
**Industrial Organization**

Sp.

Prereq.: 670 and 805.

Economic analysis of industry structure, conduct, performance, and related issues of corporate policy. Boyd, Parsons, and Tybout.

**884 G 4**  
**Advanced Economics of the Labor Market**

Sp.

Prereq.: 805 and 806.

Economic theory and empirical evidence relating to labor allocation and wage determination. Fleisher and Parnes.

**899 G 1-5**  
**Interdepartmental Seminars**

A, W, Sp.

(See under Interdepartmental Seminars.)

**900 G 5**  
**Seminar in Teaching Methods**

A, W, Sp.

Prereq.: 805 and 806.

Open only to departmental teaching associates.

Repeatable to a maximum of 25 cr. hrs.

Seminar in teaching methods and contents of undergraduate courses in economics for students pursuing the Doctor of Arts degree.

**911 G 4**  
**Seminar in Economic History, American and European**

Sp.

Prereq.: 613 and 614 or equiv. or permission of instructor.

Repeatable to a maximum of 8 cr. hrs.

Selected research topics in economic history. Sandberg.

**915 G 4**  
**Seminar in Price Theory**

Su, W.

Prereq.: 808 and 809.

Repeatable to a maximum of 8 cr. hrs.

Special topics in economic theory.

Koizumi.

**918 G 4**  
**Seminar in Economic Problems of the Soviet Union and Eastern Europe**

A.

Prereq.: 607 and 608.

Repeatable to a maximum of 8 cr. hrs.

Selected research topics. Brada and Eason.

**920 G 4**  
**Seminar in Monetary Policy**

Sp.

Prereq.: 820 and 821.

Repeatable to a maximum of 8 cr. hrs.

Application of monetary theory to issues of public policy in banking and monetary affairs; examination of public hearings and policy literature. Baltensperger, Darby, Dewald, and Kane.

**930 (830) G 4**  
**Seminar in Government Finance**

W.

Prereq.: 631 and 632.

Repeatable to a maximum of 8 cr. hrs.

Analysis of theoretical and applied aspects of fiscal economics in the American and foreign economies; selected topics of current and permanent importance. Koizumi and Oakland.

**940 G 4**  
**Seminar in Econometrics**

Sp.

Prereq.: 742 and 842 or equiv. or permission of instructor.

Repeatable to a maximum of 8 cr. hrs.

Examination of economic problems whose solutions may advantageously be sought by use of the methods of mathematics and mathematical statistics.

Cunyngham, L'Esperance, and Swamy.

**950 G 4**  
**Seminar in Economic Development and Planning**

Sp.

Prereq.: 652 and 850, or permission of instructor.

Repeatable to a maximum of 8 cr. hrs.

Selected topics in the process of economic development and in planning for development; analysis and evaluation of planning methodologies, strategies, and systems. Kelley, Michael, and Singh.

**960 G 4**  
**Seminar in International Economic Problems**

Su.

Prereq.: 861.

Repeatable to a maximum of 8 cr. hrs.

Seminar in analytical problems, theoretical and applied, of international economic adjustments; development of techniques for implementation of policies. Ray and Wipf.

**970 G 4**  
**Seminar in Structure and Regulation of Industry**

W.

Prereq.: 872.

Repeatable to a maximum of 8 cr. hrs.

Economic bases for government participation in business activities: antitrust, regulation, and collective decision making.

**980† G 4**  
**Seminar in Industrial Relations**

W.

Prereq.: 683 or equiv. or permission of instructor.

Repeatable to a maximum of 8 cr. hrs.

Selected topics and issues in contemporary trade unionism and collective bargaining.

**981 G 4**  
**Seminar in the Economics of the Labor Market**

Sp.

Prereq.: 882.

Repeatable to a maximum of 8 cr. hrs.

Selected topics and issues in wage determination, employment and unemployment. Kelley, Fleisher, and Parnes.

**991 G 4**  
**Problems in National Security Economics**

W.

Prereq.: 695 or equiv. or permission of instructor.

Repeatable to a maximum of 8 cr. hrs.

Seminar designed to analyze in depth selected economic problems of national defense and defense-related activities. Sherman.

**994 G 3-5**  
**Group Studies**

A, W, Sp.

Each decimal subdivision repeatable to a maximum of 15 cr. hrs.

Advanced courses in Economics and related fields.

**994.01 Economic Theory and History of Thought****994.02 Economic History****994.03 Money, Banking, and Monetary Policy****994.04 Government Finance and Expenditure****994.05 Econometrics****994.06 Economic Development and Development Planning****994.07 International Economics****994.08 Structure and Regulation of Industry****994.09 Labor Economics****994.10 National Security Economics****994.11 Soviet Economy****994.12 Mathematical Economics****995 G 3-5**  
**Research Seminars**

Su, A, W, Sp.

Prereq.: 75 hrs. of grad. cr.; completion of core courses in decimal subdivision or permission of seminar director.

Each decimal subdivision repeatable to a maximum of 30 cr. hrs.

Intensive study of problems in the graduate fields of specialization.

**995.01 Economic Theory and History of Thought****995.02 Economic History****995.03 Money, Banking, and Monetary Policy****995.04 Government Finance and Expenditure****995.05 Quantitative Methods in Economics****995.06 Economic Development and Development Planning****995.07 International Economics****995.08 Structure and Regulation of Industry****995.09 Labor Economics****995.10 National Security Economics****995.11 Soviet Economy****995.12 Mathematical Economics****998 G Arr.**  
**Research in Economics: Thesis**

Su, A, W, Sp.

Research for thesis purposes only.

**999 G Arr.**  
**Research in Economics: Dissertation**

Su, A, W, Sp.

Research for dissertation purposes only.

## Education

**289 U 2-5**

### Field Experience

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Professional service with children or youth in some school or community agency.

**289.13 Experience in Urban Schools**

**294 U 3-5**

### Group Studies

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Group studies for students in specialized programs.

**294.13 Experience in Urban Schools**

**594 U 3-5**

### Group Studies

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Group studies for students in specialized programs.

**594.13 Experience in Urban Schools**

**694 U G 3-5**

### Group Studies

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Group studies on special problems in education.

**694.13 Experience in Urban Schools**

**994† G 3-5**

### Group Studies

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Advanced group studies on special problems in education.

**994.13 Experience in Urban Schools**

## Educational Administration

Office: 310 Ramseyer Hall, 29 West Woodruff Avenue

**Professors** Nystrand (Chairman), Anderson, Campbell, Conrad, Cunningham, Hack, Larmee, Laughlin, Moore, Staub, and Wohlers; **Associate Professor** Wagstaff; **Assistant Professors** Farrar, Nygren, and Spillman.

Educational Administration: 199, H599, 690, 692.35, 692.44, 693.35, 693.44, 694.35, 694.44, H799, 884.35, 884.44, 899, 925.35, 925.44, 935, 936, 940, 942, 946, 947, 948, 949, 950, 951, 952, 953, 955, 956, 957, 958, 959, 960, 961, 994.35, 994.44, 999.35, 999.44.

Abbreviations: Educational Administration = Ed Admin  
Education: Curriculum and Foundations = Ed: C & F  
Education: Early and Middle Childhood = Ed: E & MC

**199† U 3**

### The Student and University Policy Development

2 1½-hr. cl.

Prereq.: Permission of instructor.

Social, political, legal, and financial factors operating in the development of policy at The Ohio State University; emphasis on role of students in the process.

**H599 U 3-5**

### Honors Course

Su, A, W, Sp.

Prereq.: Enrollment in the Honors Achievement Program and permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

A program of accelerated study for students with special aptitudes.

**690 U G 3**

### Practicum in Problems of Public Education

3 cl.

Prereq.: Ed: C & F 435; E & MC 461, or equiv., and permission of instructor.

Repeatable to a maximum of 9 cr. hrs.

Open to experienced teachers and administrators; groups are organized around specific problems; requests must be received by department chairman in time to allow for planning.

**692 U G 3, 4, 6, or 8**

### Workshops

Su. 4 cr. hrs. for 3-wk. workshops.

6 cr. hrs. for 4½wk. workshops.

8 cr. hrs. for 6-wk. workshops.

Prereq.: Teaching experience, and permission of workshop director.

Repeatable to a maximum of 16 cr. hrs.

Intensive study of a problem common to the participants for the purpose of developing sound principles and practices relating to it.

**692.35 Higher Education**

**692.44 Educational Administration**

**693 U G 1-4**

### Individual Studies

Su, A, W, Sp.

Prereq.: Ed: C & F 435 or Ed: E & MC 460, and permission of instructor.

A total of not more than 30 cr. hrs. of Individual Study (any 693) will apply toward graduation for undergrad. students, or 45 cr. hrs. for grad. students.

**693.35 Higher Education**

**693.44 Educational Administration**

**694 U G 3-5**

### Group Studies

Prereq.: Permission of instructor.

Group studies on special problems in education.

**694.35 Higher Education**

**694.44 Educational Administration**

**H799 U G 3-5**

### Honors Course

Su, A, W, Sp.

Prereq.: Enrollment in the Honors Achievement Program and permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

A program of accelerated study and research for students with special aptitudes.

**884 G 3-15****Planned Field Experience**

Prereq.: Permission of area adviser.

Planned professional administrative experience in a public school or other educational agency under supervision.

**884.35 Higher Education**

**884.44 Educational Administration**

**899 G 1-5****Interdepartmental Seminar**

(See under Interdepartmental Seminars.)

**925 G 2-5****Seminars**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Students with permission of advisers may register for more than one section of 925 or for the same section two or more times.

Research problems in:

**925.35 Higher Education**

Laughlin and Larmee.

**925.44 Educational Administration**

Conrad and Laughlin.

**935 G 3****The Community College**

A, Sp. 2 1½-hr. cl.

Not open to students with credit for Ed. 906 or 939.

History of community colleges; evaluation of organization and administration; campus planning; and federal, state, and local governmental relations with these colleges. Moore.

**936 G 3****Curriculum and Instruction in the Community College**

Su, W. 2 1½-hr. cl.

Not open to students with credit for Ed. 907.

Review of sociological technological changes affecting higher education; analysis of curriculum, instruction, counseling, and community services; and summary of characteristics of students and faculty. Moore.

**940 G 3****Administration of Higher Education**

Su, A, W. 2 2-hr. cl.

Purposes and scope of higher education; governance; problems of administration-student-staff relationships; and administrative organization. Laughlin and Moore.

**942 G 3****Administration of Academic Affairs in Higher Education**

Sp. 2 1½-hr. cl.

Principles and problems of administering academic affairs in light of development, financial considerations, and evaluation. Laughlin.

**946 G 3****Introduction to Educational Administration**

Su, A, W, Sp.

Prereq.: Ed: E & MC 585 or Secondary (587) student teaching, or equiv.

Introduction to the organizational setting of the school, the nature of administration, and organizational theory. Farrar, Hack, Larmee, and Staub.

**947 G 3****Human Relations in Educational Administration**

Su, A, W, Sp.

Prereq.: 946.

Interpersonal behavior in educational organizations with emphasis on such topics as goal-setting, decision-making, communicating, conflict management, and evaluation. Anderson, Nystrand, Spillman, and Wagstaff.

**948 G 3****The Elementary School Principalship**

Su, A, W. 1 2½-hr. cl.

Prereq.: 946.

Emphasis is given to the elementary school principal's role in providing leadership in policy-making, personnel matters, public relations, research, and business management. Staub.

**949 G 3****Administration of Secondary Schools**

Su, W, Sp. 1 3-hr. cl.

Prereq.: 946.

A study of educational administration in the secondary school with emphasis on problems and issues in organization, personnel, public relations, instructional leadership, and management. Wagstaff.

**950 G 3****Problems of Beginning Superintendents**

Su. 1 2½-hr. cl.

Prereq.: 946.

Definition of the superintendent's role, and the roles of the board of education, school staff, and community; examination of problems indigenous to conflict among roles. Larmee.

**951 G 3****Administrative Problems of the City School System**

Su, A, Sp. 1 3-hr. cl.

Prereq.: 946.

A study of problems of educational administration in the complex city school system with emphasis on solution of educational problems caused by the unique demographic characteristics of the city. Moore and Spillman.

**952 G 3****Legal Aspects of School Administration**

Su, A, Sp. 1 2½-hr. cl.

Prereq.: 946, or equiv.

A study of statutory and case law, legal principles and provisions relevant to educational administration, particularly in the areas of personnel, finance, curriculum, contracts, property, liability, and organization. Staub.

**953 G 3****School Community Relations**

Su, W, Sp. 1 2½-hr. cl.

Prereq.: 946, or equiv.

Principles and practice in developing and maintaining appropriate school community relationships; opinion analysis; communication processes; decision-making patterns. Nystrand and Staub.

**955 G 3****Staff Personnel Administration**

Su, A, Sp.

Prereq.: 946.

Study of personnel administration in educational institutions; theory, principles and practices as they relate to personnel policy, recruitment, selection, orientation, appraisal, in-service education, promotion, collective negotiations, general welfare. Larmee.

**956 G 3****School Finance**

Su, A, Sp. 1 3-hr. cl.

Prereq.: 946.

Examination of the theory and economics of financing public education; emphasis on sources of revenue, variations in ability and effort, state-local plans, and the federal role. Hack.

**957 G 3****Business Administration of Schools**

Su, W. 1 3-hr. cl.

Prereq.: 946.

Function and role of business administrators in schools; emphasis on budgeting; payroll and accounting; purchasing; planning, constructing, operating, and maintaining the school plant. Hack.

**958 G 3****School Plant Planning**

Su, A. 1 2-hr. cl.

Prereq.: 946, or equiv.

Problems and techniques in determining educational facility needs, evaluating facilities, planning for new construction and remodeling, utilizing specialized personnel; related legal and financial aspects. Conrad.

**959 G 4****Doctoral Core in Educational Administration I**

A. 1 cl., lab. arr.

Prereq.: 946, master's degree, 2 yrs. teaching experience or equiv., and permission of instructor.

Analysis of significant research in educational administration. Wagstaff and Laughlin.

**960 G 4****Doctoral Core in Educational Administration II**

W. 1 cl., lab. arr.

Prereq.: 959.

Advanced study of administrative problems and organizational behavior from an interdisciplinary perspective. Larmee and Moore.

**961 G 4****Doctoral Core in Educational Administration III**

Sp. 1 cl., lab. arr.

Prereq.: 960.

Continuation of 960. Hack and Nystrand.

**994 G 3-5****Group Studies**

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Advanced group studies on special problems in education.

994.35 Higher Education

994.44 Educational Administration

**999 G Arr.****Research**

Su, A, W, Sp.

Refer to decimal subdivisions under 925.

Research for thesis or dissertation purposes only.

## Educational Development

Office: 221 Ramseyer Hall, 29 West Woodruff Avenue

**Professors** Wayson (Chairman), Anderson, Blanke, Cook, Glatt, Mooney, Roaden, D. Sanders, Severino, and Snyder; **Associate Professors** Bargar, Buchanan, Gunnell, Hudspeth, Kennedy, Merriman, Novak, and Trzebiatowski; **Assistant Professors** Lange and J. Sanders.

Educational Development: 294.48, 294.50, 541, 544, 594.48, 594.50, H599, 680, 689, 690, 692.48, 693.48, 694.48, 694.50, 725, 784, 785, 786, 787, 788, 789, 790, 791, H799, 808, 809, 884.48, 884.50, 899, 925.48, 925.50, 965, 966, 967, 968, 969, 994.48, 994.50, 999.48, 999.50.

Abbreviations: Educational Development = Ed Devel

Education: Curriculum and

Foundations = Ed: C &amp; F

Education: Early and Middle

Childhood = Ed: E &amp; MC

**294 U 3-5****Special Group Studies**

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Group studies for students in specialized programs.

294.48 Educational Development

294.50 Educational Change

**541 U 3****Empirical Methods in Educational Development**

A, W, Sp. 1 2-hr. cl., 1 2-hr. lab.

Prereq.: Permission of instructor.

Repeatable to a maximum of 9 cr. hrs.

A study of empirical methods as they apply in educational research, development, and evaluation settings. Bargar.

**544 U 3****Seminar in Empirical Methods**

A, W, Sp. 1 2-hr. cl., 1 hr. arr.

Repeatable to a maximum of 9 cr. hrs.

Seminar in empirical methods in educational research, development, and evaluation; emphasis on application of techniques to educational problems. Bargar.

**594 U 3-5****Group Studies**

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Group studies for students in specialized programs.

594.48 Educational Development

594.50 Educational Change

**H599 U G 3-5****Honors Course**

Su, A, W, Sp.

Prereq.: Enrollment in the Honors Achievement Program and permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

A program of accelerated study for students with special aptitudes.

**680 U G 1****Advanced Seminar in Empirical Methods**

A, W. 1 2-hr. cl. every other wk.

Prereq.: 541, 544, or permission of instructor.

Repeatable to a maximum of 2 cr. hrs.

Discussion of advanced methodological concepts as they apply to educational research, development, and evaluation. Bargar.

**689 U G 5-15****Study Tours of Foreign Schools and Culture**

Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 25 cr. hrs. when different areas of topics are studied.

Five weeks intensive study of educational and cultural topics fundamental to central purpose of tour, then equal period of supervised observation of schools and related cultural factors in one or more foreign countries; specific emphases of separate tours to be announced.

**690 U G 3****Practicum in Problems of Public Education**

3 cl.

Prereq.: Ed: C & F 435, Ed: E & MC 461, or equiv., and permission of instructor.

Repeatable to a maximum of 9 cr. hrs.

Open to experienced teachers and administrators; groups are organized around specific problems; requests must be received by department chairman in time to allow for planning.

**692 U G 4, 6, or 8****Workshops**

Su. 4 cr. hrs. for 3-wk. workshops.

6 cr. hrs. for 4½-wk. workshops.

8 cr. hrs. for 6-wk. workshops.

Prereq.: Teaching experience, and permission of workshop director.

Repeatable to a maximum of 16 cr. hrs.

Intensive study of a problem common to the participants for the purpose of developing sound principles and practices relating to it.

**693 U G 1-4****Individual Studies**

Su, A, W, Sp.

Prereq.: Ed: C & F 435, Ed: E & MC 460, and permission of instructor.

A total of not more than 30 cr. hrs. of Individual Study (any 693) will apply toward graduation for undergrad. students, or 45 cr. hrs. for grad. students.

**694 U G 3-5****Group Studies**

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Group studies on special problems in education.

**694.48 Educational Development**

**694.50 Educational Change**

**725 U G 3****Education and National Development**

Sp. 1 3-hr. cl.

Roles of education in national economic and social development: includes strategies for educational development and introduction to educational planning. Sanders.

**750 (967) U G 3****Program/Project Management**

Sp. 1 2½-hr. cl.

Prereq.: 788.

The use of management information systems in the planning and controlling of educational research and development projects, with particular emphasis on network planning techniques. Cook.

**784 U G 3-12****Internship in Educational Development**

Su, A, W, Sp. Arr.

Prereq.: 541 and 544, or permission of instructor.

Repeatable to a maximum of 12 cr. hrs.

Internship experiences in research, development, or evaluation settings. Bargar.

**785 U G 3****Introduction to Inquiry, Principles, Strategies, and Techniques**

Su, A, W, Sp. 2 2-hr. cl.

Prereq.: Permission of instructor.

Introduction to inquiry strategies and their role in educational development; emphasis is on the conceptualization of educational problems. Bargar, Kennedy, and Gunnell.

**786 U G 3****Introduction to Inquiry: Quantitative Methods**

Su, A, W, Sp. 2 2-hr. cl.

Prereq.: 785 or equiv., or permission of instructor.

An introduction to quantitative techniques, with emphasis on application in educational settings. Bargar, Kennedy, and Gunnell.

**787† U G 3****Classroom Test Construction**

1 3-hr. cl.

Prereq.: 4th yr. or grad. standing.

General principles and techniques for construction and utilization of classroom tests for assessment of student achievement. Stufflebeam.

**788 U G 4****Systems Concept in Education**

Su, A, Sp. 2 2-hr. cl.

Prereq.: 4th yr. or grad. standing.

Introduction to general systems theory and an overview of its utilization and application in the field of education. Cook and Trzebiatowski.

789

U G 3

**Population Analysis and Educational Planning**

W. 1 2½-hr. cl.

Prereq.: 785 or equiv., and Soc. 751 or 754.

Repeatable to a maximum of 6 cr. hrs.

A seminar designed to study population trends, movements, and distributions as they relate to more effective planning for school systems. Glatt.

790

U G 3

**Problems and Processes in School Desegregation**

A, Sp. 1 2½-hr. cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 6 cr. hrs.

A seminar designed to study major problems related to school desegregation and processes of solving those problems. Glatt.

791

U G 4

**Information Processing in Education**

W. 1 2½-hr. cl., 1 hr. lab arr.

Major emphases are placed on current applications, limitations, problems, and potential of data processing, information system, and computer technology in education. Novak.

H799

U G 3-5

**Honors Course**

Su, A, W, Sp.

Prereq.: Enrollment in the Honors Achievement Program and permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

A program of accelerated study and research for students with special aptitudes.

808

G 3

**Experimental Design in Education I**

W. 2 1½-hr. cl.

Prereq.: 786, or equiv.

An examination of logical and quantitative principles, especially the analysis of variance, underlying basic experimental designs employed in educational research. Kennedy.

809

G 3

**Experimental Design in Education II**

Sp. 2 1½-hr. cl.

Prereq.: 808, or equiv.

An examination of intermediate quantitative principles underlying experimental design in education, such as repeated measures designs, hierarchical designs, and the analysis of covariance. Kennedy.

884

G 3-15

**Planned Field Experience**

Prereq.: Permission of area adviser.

Planned professional teaching experience in a public school or other educational agency under supervision.

884.48 Educational Development

884.50 Educational Change

899

G 1-5

**Interdepartmental Seminar**

(See under Interdepartmental Seminars.)

925

G 2-5

**Seminars**

Prereq.: Permission of instructor.

Students with permission of advisers may register for more than one section of 925, or for the same section two or more times.

Research problems in:

925.48 Educational Development

A, W, Sp.

925.50 Educational Change

Su, W.

965

G 3

**Evaluation Functions and Methodology in Education**

A, Sp. 3 cl.

Prereq.: Psych. 510, or equiv.

The functions and methodology of evaluation relative to planned educational change, with emphasis on the relationships between data collection, analysis, reporting, and relevant decision processes. Lange.

966†

G 3

**Research Process: Practicum in Educational Research**

3 cl.

Prereq.: Previous courses in the basic sequence in educational research methodology, or permission of instructor.

The utilization of research strategies in the pursuit of educational problems, with emphasis upon the development, conduct, and completion of individual projects.

968

G 3

**Problems in the Development of Research Projects**

A. 3 cl.

Prereq.: 786, Psych. 510, or equiv.

A discussion of conceptual, methodological, and communication problems encountered in the development of research projects; faculty members engaged in project development are invited to participate. Novak.

969

G 3

**Planning-Programming-Budgeting System in Education**

W. 1 3-hr. cl.

Prereq.: 788.

Principles and problems associated with utilization of planning-programming-budgeting system as for educational decision-making and resource allocation. Cook.

994

G 3-5

**Group Studies**

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Advanced group studies on special problems in education.

994.48 Educational Development

994.50 Educational Change

999

G Arr.

**Research**

Su, A, W, Sp.

Research for thesis or dissertation purposes only.

999.48 Educational Development

999.50 Educational Change

## Educational Special Services

Office: 253 Arps Hall, 1945 North High Street

**Professors** Wigtil (Chairman), Dowling, MacMinn, Peters, Quaranta, Riccio, and Tripp; **Associate Professor** Ohliger; **Assistant Professors** Carr, Johnson, Kelsey, Silverman, and Tosi.

Adult Education: 289.02, 294.33, H599, 672, 673, 692.33, 693.33, 694.33, H799, 925.33, 931, 932, 933, 934, 994.33, 999.33.

Guidance and Counseling (Counselor Education): 289.01, 289.02, 289.37, 294.01, H599, 692.34, 693.34, 694.34, H799, 874, 875, 876, 877, 878, 879, 880, 884.34, 925.34, 973, 974, 975, 976, 977, 978, 994.34, 999.34.

Student Personnel Work in Higher Education: 289.02, H599, 692.32, 693.32, 694.32, 780, 781, 782, H799, 884.32, 887, 888, 925.32, 926, 930, 938, 943, 945, 954, 994.32, 999.32.

Abbreviations: Educational Special Services = Ed Sp Sv  
Education: Curriculum and Foundations = Ed: C & F  
Education: Early and Middle Childhood = Ed: E & MC

### 289

#### Field Experience

Prereq.: Permission of instructor.

Professional service with children or youth in some school or community agency.

#### 289.01 Introductory Experience in a School System U 5

A, W, Sp.

Repeatable to a maximum of 10 cr. hrs., with special permission when unusual circumstances warrant.

#### 289.02 Experience in a Community Agency U 2-5

Repeatable to a maximum of 20 cr. hrs.

#### 289.37 Tutoring U 2-5

Su, A, W, Sp.

Repeatable to a maximum of 20 cr. hrs.

### 294

U 3-5

#### Group Studies

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Group studies for students in specialized programs.

#### 294.01 Evaluation of Field Experiences

#### 294.33 Adult Education

### H599

U 3-5

#### Honors Course

Su, A, W, Sp.

Prereq.: Enrollment in the Honors Achievement Program and permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

A program of accelerated study for students with special aptitudes.

### 672

U G 3

#### Introduction to Adult Education

Su, A, W, Sp.

Prereq.: 4th yr. standing; for Ed. majors; Ed: C & F 435 or Ed: E & MC 461.

The nature, extent, and significance of adult education; history and types of adult education; theoretical issues; adult learning and methodology; present trends and future developments.

### 673

U G 3

#### Parent Education

Su, W. 1 2½-hr. cl.

Prereq.: 4th yr. standing; for Ed. majors; Ed: E & MC 461 or Ed: C & F 435.

Nature, extent, and significance of the parent education movement; home and school relationships; methods and resources; training professional and lay leaders; local and state programs.

### 692

U G 4, 6, or 8

#### Workshops

Su. 4 cr. hrs. for 3-wk. workshops.

6 cr. hrs. for 4½-wk. workshops.

8 cr. hrs. for 6-wk. workshops.

Prereq.: Teaching experience, and permission of workshop director.

Repeatable to a maximum of 16 cr. hrs.

Intensive study of a problem common to the participants for the purpose of developing sound principles and practices relating to it.

#### 692.32 Student Personnel Work

#### 692.33 Adult Education

#### 692.34 Guidance and Counseling

### 693

U G 1-4

#### Individual Studies

Su, A, W, Sp.

Prereq.: Ed: C & F 435 or Ed: E & MC 460, and permission of instructor.

A total of not more than 30 cr. hrs. of Individual Study (any 693) will apply toward graduation for undergrad. students, or 45 cr. hrs. for grad. students.

#### 693.32 Student Personnel Work

#### 693.33 Adult Education

#### 693.34 Guidance and Counseling

### 694

U G 3-5

#### Group Studies

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Group studies on special problems in education.

#### 694.32 Student Personnel Work

#### 694.33 Adult Education

#### 694.34 Guidance and Counseling

### 780

U G 3

#### Introduction to Student Personnel Work

Su. 2 1½-hr. cl.

The nature of and the issues involved in student personnel work in higher education.

### 781

U G 2

#### The Academic Advising Process

W. 2 cl.

Prereq.: Permission of instructor.

An overview of the academic advisement process including practical and philosophical questions about advisement and the role of the adviser.

### 782

U G 3

#### The Practice of College Student Personnel Work

A. 2 1½-hr. cl.

Prereq.: Permission of instructor.

First practical course in professional sequence; prerequisite to field work practica; major services are examined and discussed; outstanding practitioners consult on their work.



**H799 U G 3-5****Honors Course**

Su, A, W, Sp.

Prereq.: Enrollment in the Honors Achievement Program and permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

A program of accelerated study and research for students with special aptitudes.

**874 G 3****Introduction to Guidance Services**

Su, A, W, Sp.

Prereq.: Ed: C & F 435.

Background and purposes of guidance services; techniques used in studying the individual; informational services; counseling service; placement and follow-up; developing a guidance program.

**875 G 3****Group Processes**

Su, A, W, Sp. 1 2½-hr. cl.

Prereq.: Permission of instructor.

Theories, issues, trends, and supervised practice.

**876 G 3****Organization and Administration of Guidance Services**

Su, A, W. 3 cl.

Prereq.: 874, or equiv.

The selection, organization, and presentation of guidance materials, including analysis of types of organization, methods of initiating a guidance program, and types of in-service programs.

**877 G 3****Guidance Appraisal Techniques**

Su, A, Sp. 1 2½-hr. cl.

Prereq.: 874.

Basic concepts and techniques in the appraisal of the individual nonstandardized methods.

**878 G 3****Guidance Appraisal Techniques**

Su, A, W. 1 2½-hr. cl.

Prereq.: 874.

Basic concepts and techniques in the appraisal of the individual; standardized methods.

**879 G 5****Educational and Vocational Guidance**

Su, A, W, Sp. 1 2½-hr. cl., 1 2-hr. lab.

Prereq.: 874, 878 and permission of instructor.

Theories, instruments, resources for educational and vocational guidance of elementary and secondary students including an analysis of post-secondary school educational opportunities.

**880 G 3****Guidance Practices in the Elementary School**

Su, A, Sp. 1 2½-hr. cl.

Prereq.: 874.

The application of guidance concepts and services to the elementary school situation.

**884 G 3-15****Planned Field Experience**

Prereq.: Permission of area adviser.

Planned professional teaching experience in a public school or other educational agency under supervision.

**884.32 Student Personnel Work**

**884.33 Adult Education**

**884.34 Guidance and Counseling**

**887 G 3****Student Personnel Programs for the Culturally Different**

Su, A. 1 2½-hr. cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 6 cr. hrs.

A survey of collegiate experimental programs and practices, their philosophies, organization, administration, educational audiences, etc., for the culturally different with emphasis on black Americans.

**888 G 3****Interpersonal Relations in Student Personnel Work**

W, Sp. 1 2½-hr. cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 9 cr. hrs.

Emphasis on laboratory learning process for interpersonal growth; treatment of group theory, processes, and dynamics.

**925 G 2-5****Seminars**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Students with permission of advisers may register for more than one section of 925 or for the same section two or more times.

Research problems in:

**925.32 Student Personnel Work**

Su, A, Sp.

**925.33 Adult Education**

Su, A, W, Sp.

**925.34 Guidance and Counseling**

Su, A, W, Sp.

**926 G 3****Student Personnel Work as a Professional Field**

Sp. 2 1½-hr. cl.

Prereq.: Permission of instructor.

The principal objective is to provide an opportunity, by a study of current, historical, and philosophical materials, for the formulation of a sound intellectual basis for professional practice in student personnel work.

**930 G 6-12****Internship in College Student Personnel Work**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 18 cr. hrs.

The student is assigned as a participant-observer in a work situation closely approximating his vocational goal, under the supervision of a qualified practitioner; full-time commitment is normally expected.

**931 G 3****General Methods in Adult Education**

Su, W. 1 2½-hr. cl.

Prereq.: Permission of instructor.

The psychological and sociological factors affecting adults as learners; the uses and adaptations of various methods and techniques for teaching adults.

**932 G 3****Discussion Methods in Adult Education**

Su, Sp. 1 2½-hr. cl.

Prereq.: 672, and permission of instructor.

The roundtable, forum, panel symposium, and other forms of discussion as applied to adult groups; laboratory practice; clinical analysis of individual difficulties.

**933 G 9****Internship in Adult Education**

Su, A, W, Sp.

Prereq.: 672, and 12 cr. hrs. of grad. work in adult education.

Repeatable to a maximum of 18 cr. hrs.

Limited to Ph.D. majors in adult education and selected master's candidates with major in adult education.

**934 G 3****Organization and Administration of Adult Education Programs**

A, Sp. 1 2½-hr. cl.

Prereq.: 672, and permission of instructor.

Methods of determining needs, developing programs, staffing, financing, evaluating, and improving adult education programs in colleges and universities, public schools, and other agencies.

**938† G 3****Instruction in Higher Education**

3 cl.

A study of the teaching-learning environment in college, including student culture, learning theory and classroom procedure, examinations, and evaluation.

**943 G 3****Interaction of the Student and the College Environment**

Sp. 2 1½-hr. cl.

A focus on the nature of the college environment, entering student, academic procedures, student performance, and student culture for those planning careers in college student personnel work.

**945 G 5****Practicum in Student Personnel Work**

Su, W, Sp. 1 1½-hr. cl., 6 hrs. lab. in personnel agency arr.

Prereq.: Permission of instructor.

Repeatable to a maximum of 6 cr. hrs.

Supervised practicum in campus student personnel agencies such as admissions, dean of students, housing, international students, student financial aids, student union, and undergraduate college offices.

**954 G 3****Theory and Practice of Student Personnel Administration**

Su, W. 1 3-hr. cl.

The organization and administration of student personnel services. Organizational theory and approaches to organizational development, in the interest of institutional renewal, are considered.

**973 G 3****Introduction to Counseling**

Su, A, W, Sp. 2 1½-hr. cl.

Prereq.: 874.

Emphasis on theoretical bases of counseling and on the counseling relationship.

**974 G 3****Supervised Practice in Individual Counseling: Children**

Su, A, Sp. 1 2½-hr. cl.

Prereq.: 874, 973 or Psych. 882, and permission of instructor.

Repeatable to a maximum of 9 cr. hrs.

Emphasis on counseling techniques unique to elementary-age children including play media and conceptualizing the environmental press on the child.

**975 G 3****Supervised Practice in Group Counseling: Children**

W. 1 2½-hr. cl.

Prereq.: 874, 973 or Psych. 882, and permission of instructor.

Repeatable to a maximum of 9 cr. hrs.

Supervision of each enrollee who counsels with a group of children of elementary age in a school or other institutional setting.

**976 G 3****Supervised Practicum in Individual Counseling: Adolescent and Adult**

Su, A, W, Sp. 1 2½-hr. cl.

Prereq.: 874, 973 or Psych. 882, and permission of instructor.

Repeatable to a maximum of 9 cr. hrs.

Supervised practice in counseling individual clients of adolescent or adult age; emphasis on developing counseling skills, including: counseling relationship; conceptualizing clients; self-understanding.

**977 G 3****Supervised Practice in Group Counseling: Adolescents and Adults**

Su, A, Sp. 1 2½-hr. cl.

Prereq.: 874, 973 or Psych. 882, and permission of instructor.

Repeatable to a maximum of 9 cr. hrs.

Supervision of each enrollee who counsels with a group of adolescents or adults in a school or other institutional setting.

**978 G 3****Supervised Field Experience in Counseling**

Su, A, W, Sp. 1 2½-hr. cl.

Prereq.: 874, 973 or Psych. 882, and permission of instructor.

Repeatable to a maximum of 9 cr. hrs.

Supervised practice in guidance and counseling activities in the work setting; emphasis on the range of activities performed by guidance workers in school and related settings.

**994 G 3-5****Group Studies**

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Advanced group studies on special problems in education.

**994.32 Student Personnel Work**

**994.33 Adult Education**

**994.34 Guidance and Counseling**

**999 G Arr.****Research**

Su, A, W, Sp.

Refer to decimal subdivisions under 925.

Research for thesis or dissertation purposes only.

## Education: Curriculum and Foundations

Office: 121 Ramseyer Hall, 29 West Woodruff Avenue

**Professors** Frymier (Chairman), Alberty, Cruickshank, Duncan, Galloway, Hough, Klohr, Mehl, Reagan, Sutton, and Tyler; **Associate Professors** Belland, Pratte, and Williams; **Assistant Professor** Smith.

**Educational Communications:** 294.43, 294.46, 594.43, 594.46, 675, 677, 678, 679, 692.43, 693.43, 693.46, 694.43, 694.46, 806, 884.43, 884.46, 889, 925.43, 925.46, 994.43, 994.46, 999.43, 999.46.

**Curriculum and Supervision:** 294.49, 594.49, 692.49, 693.49, 694.49, 857, 859, 860, 861, 865, 866, 868, 870, 871, 872, 873, 884.49, 922, 925.49, 941, 994.49, 999.49.

**History of Education:** 294.40, 594.40, 640.71, 640.72, 641.71, 641.72, 641.77, 641.78, 642.72, 689, 693.40, 694.40, 722, 724, 884.40, 925.40, 927, 928, 929, 994.40, 999.40.

**Philosophy of Education:** 294.41, 594.41, 640.73, 641.75, 641.76, 642.73, 693.41, 694.41, 884.41, 911, 912, 913, 914, 915, 916, 917, 925.41, 994.41, 999.41.

**Sociology of Education:** 640.74, 641.74, 862.

**Teacher Education and Instruction:** 108, 435, 693.36, 694.36, 768, 822, 857, 863, 864, 867, 869, 870, 871, 872, 884.36, 922, 925.36, 937, 944, 994.36, 999.36.

**Abbreviations:** Education: Curriculum and Foundations = Ed: C & F  
Education: Early and Middle Childhood = Ed.: E & MC

**108† U 3****Introduction to the Study of Education**

3 cl.

An introductory study of cultural factors that affect education, with students helped to understanding through an examination of their own lives.

**294 U 3-5****Special Group Studies**

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Group studies for students in specialized programs.

**294.40 History of Education and Comparative Education**

**294.41 Philosophy of Education**

**294.43 Radio and Television Education**

**294.46 Audiovisual Materials of Instruction**

**294.49 Curriculum and Supervision**

**435 U 5****Theory and Practice in Secondary Education**

Su, A, W, Sp. 4 2-hr. cl.

Prereq.: Psych. 230; students in Phys. Ed.; Phys. Ed. 232, or equiv.

A laboratory field experience course introducing topics, problems, and skills common to prospective secondary school teachers.

**594 U 3-5****Group Studies**

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Group studies for students in specialized programs.

**594.40 History of Education and Comparative Education**

**594.41 Philosophy of Education**

**594.43 Radio and Television Education**

**594.46 Audiovisual Materials of Instruction**

**594.49 Curriculum and Supervision**

**640 U G 3****Foundations of Education I**

Su, A, W, Sp.

Prereq.: 3rd yr. standing.

**640.71 Social Criticism in American Education**

1 2½-hr. cl.

Not open to students with credit for 636.

An analysis of the major critical stances taken in the history of American education. Mehl.

**640.72 History of Modern Education**

3 cl.

Not open to students with credit for 632.

Education and schools as factors in the development of the modern world: theories, practice, relations with other social institutions and forces, especially in Europe and America. Sutton.

**640.73 Introduction to Philosophy of Education**

3 cl.

Not open to students with credit for 637.

Application of the methods and techniques of philosophical analysis to educational problems. Pratte, Reagan, and Smith.

**640.74 Introduction to Sociology of Education**

3 cl.

An application of sociological theories, methods, and data to the analysis of educational practices and problems.

**641 U G 3****Foundations of Education II**

Su, A, W, Sp.

**641.71 People, Politics, and Schools**

1 2½-hr. cl.

Prereq.: 3rd yr. standing.

An analysis of the political forces and ideological positions in American life since the Civil War and their effects on American education. Mehl.

**641.72 Education in Earlier Times**

3 cl.

Prereq.: 3rd yr. standing.

Not open to students with credit for 632.

Schools and educational ideals in ancient and medieval societies; education before the rise of modern nation states; influence on contemporary practice and thinking. Sutton.

**641.74 Advanced Sociology of Education**

3 cl.

Prereq.: 3rd yr. standing and 640.74.

Continuation of 640.74.

**641.75 Logic in Teaching**

2 1½-hr. cl.

Prereq.: 640.73, and 4th yr. standing.

Study of the logical aspects of teaching; includes attention to definitions, arguments, explanations, questions, and value judgments. Reagan.

**641.76 Educational Theory**

3 cl.

Prereq.: 640.71 or 640.72 or 640.73, and 4th yr. standing.

To assist pre-service teachers in securing perspective with reference to the various movements and practices that are embodied in contemporary theories of education. Pratte.

**641.77 Comparative Education**

1 2½-hr. cl.

Prereq.: 640.71 or 640.72 or 640.73, and 4th yr. standing.

Not open to students with credit for 723.

Social and cultural factors influencing the differential development of educational institutions and organization. Sutton.

**641.78 History of Black Education in America**

3 cl.

Not open to students with credit for Ed. 638.

Traces the historical development of the black American's experience and response to schools and other social institutions which exert educational influence. Simmons.

**642† U G 3****Foundations of Education III**

Sp. 3 cl.

**642.72 Special Topics in History of Education**

Prereq.: 640.71 or 640.72, and permission of instructor. Develops and examines a selected topic in history of education.

**642.73 Special Topics in Philosophy of Education**

Prereq.: 640.73, and permission of instructor. Develops and examines a selected topic in philosophy of education; among possible topics are ethnics and education; aesthetics and education; and existentialism and education.

**675 U G 4****Audiovisual Materials of Instruction**

Su, A, W, Sp. 2 cl., 2 2-hr. lab.

Prereq.: 4th yr. standing.

The contribution of audiovisual materials to educational objectives emphasizing the classroom use of such materials, utilization practices, basic sources of information, selection, and evaluation of film and records. Eboch.

**677 U G 3****Radio and Television in Education**

Su, A, W. 2 2-hr. cl.

Prereq.: 4th yr. standing.

The varied types of educational broadcasting in relation to objectives, planning, production, utilization, and evaluation. Tyler.

**678 U G 2****Design of Instructional Materials Systems Components**

W, Sp. 2-qr. sequence; W. 1 2-hr. cl.; Sp. 1 cl., 1 2-hr. lab.; credit given on completion of 4 cr. hrs.

Must enroll to a maximum of 4 cr. hrs.

Prereq.: 675, or equiv., and permission of instructor.

Design, development, and production of instructional materials components for specific existing educational media subsystems in educational agencies. Eboch.

**679 U G 3****Development and Management of Instructional Systems**

A, Sp. 1 3-hr. cl.

Prereq.: 675, or equiv.

Functions and operations of educational media subsystems for varying instructional strategies; emphasis on development and management of comprehensive services for educational agencies. Eboch.

683 and 684, now in Education: Early and Middle Childhood, will be transferred to Education: Curriculum and Foundations by Summer Quarter.

**689 U G 5-15****Study Tour of Foreign Schools and Culture**

Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 25 cr. hrs. when different areas or topics are studied.

Five weeks intensive study of educational and cultural topics fundamental to central purpose of tour, then equal period of supervised observation of schools and related cultural factors in one or more foreign countries; specific emphases of separate tours to be announced.

**692 U G 4, 6, or 8****Workshops**

Su. 4 cr. hrs. for 3-wk. workshops.

6 cr. hrs. for 4½-wk. workshops.

8 cr. hrs. for 6-wk. workshops.

Prereq.: Teaching experience, and permission of workshop director.

Repeatable to a maximum of 16 cr. hrs.

Intensive study of a problem common to the participants for the purpose of developing sound principles and practices relating to it.

**692.43 Modern Media and Materials****692.49 Curriculum and Instruction****693 U G 1-4****Individual Studies**

Su, A, W, Sp.

Prereq.: 435 or Ed: E &amp; MC 460, and permission of instructor.

A total of not more than 30 cr. hrs. of Individual Study (any 693) will apply toward graduation for undergrad. students, or 45 cr. hrs. for grad. students.

**693.36 Teacher Education and Instruction****693.40 History of Education and Comparative Education****693.41 Philosophy of Education****693.43 Radio and Television Education****693.46 Audiovisual Materials of Instruction****693.49 Curriculum and Supervision**

**694 U G 3-5****Group Studies**

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Group studies on special problems in education.

**694.36 Teacher Education and Instruction**

**694.40 History of Education and Comparative Education**

**694.41 Philosophy of Education**

**694.43 Radio and Television Education**

**694.46 Audiovisual Materials of Instruction**

**694.49 Curriculum and Supervision**

**722 U G 3****The School in American Culture**

A. 1 cl., 1 3-hr. lab. Field trips arr.

Prereq.: One or more courses from 640 series, or equiv.

Open only to new international students.

An orientation to the contemporary American school by direct observation correlated with study of major historical forces affecting education. Sutton.

**724 U G 3****Historical and Cultural Factors in the Evolution of Educational Systems**

W. 1 2½-hr. cl.

Prereq.: One or more courses from 640 series or equiv.

Social and historical factors affecting stability and effectiveness of educational institutions and organizations in countries where programs of universal education are of recent origin. Sutton.

**768 U G 3****Directing Student Teachers**

Su, A, Sp. 1 2½-hr. cl.

Prereq.: Bachelor's degree, teacher's certificate, and teaching experience.

Course will be transferred to Education: Early and Middle Childhood by Summer Quarter.

Principles and techniques for directing the laboratory experiences of student teachers and other teacher education students. Kerber.

**806 G 3****Fundamentals of Instructional Materials and Media**

Su. 1 3-hr. cl.

Prereq.: 675, or practical experience in using educational media in school settings.

Not open to students with credit for 676.

Theory in educational media applied to the process of instructional development. Belland.

**822 G 3****Simulation and Gaming in Education**

Su, A. 1 3-hr. cl.

Intended to familiarize participants with the potential of simulation, gaming, and other synthetic experiences as methodologies for pre- and in-service education. Cruickshank.

**857 G 3****Individualizing Instruction**

Su, W. 1 2½-hr. cl.

A study of the theory, practice, and materials related to individualizing instruction. Frymier.

**859 G 3****The Junior High School Curriculum**

A. 1 2½-hr. cl.

Prereq.: 435, or equiv.

A study of the various types of junior high school programs, with special emphasis upon teaching-learning procedures as they apply to the early adolescent years. Alberty.

**860 G 3****Fundamentals of Curriculum**

Su, A, W, Sp. 1 2½-hr. cl.

Not open to students with credit for 868.

A beginning course in curriculum designed to serve as an overview of the field of curriculum and instruction; kindergarten through 12th grade. Klohr, Tyler, and Alberty.

**861 G 3****Fundamentals of Supervision**

Su, A, W, Sp. 1 2½-hr. cl.

A beginning course in supervision of instruction emphasizing general principles and practices in elementary and secondary schools. Frymier.

**862 G 3****The Role of the School in the Social Order**

Su, A, W, Sp. 1 2½-hr. cl.

Prereq.: Ed: E & MC 585 or Secondary (587) student teaching, or equiv.

An orientation course for teachers and administrators which deals with the basic purposes of secondary education in relation to major issues and current trends.

**863 G 3****Evaluation in Secondary Schools**

Su, A, Sp. 1 2½-hr. cl.

Prereq.: Ed: E & MC 585 or Secondary (587) student teaching, or equiv.

Study of techniques of evaluation in secondary schools; attention is given to current evaluation practices with emphasis on procedures appropriate to Ohio schools. Duncan.

**864 G 3****Fundamentals of Instruction**

Su, A, W, Sp. 1 2½-hr. cl.

Prereq.: Ed: E & MC 585 or Secondary (587) student teaching, or equiv.

Survey of instructional theory and related behavioral science disciplines; emphasis is on application of principles of instructional theory to classroom teaching. Duncan and Hough.

**865 G 3****Curriculum Theory**

Su, W, Sp. 2 1½-hr. cl.

Prereq.: 860, or equiv.

An advanced course in curriculum: kindergarten through the 12th grade. Klohr.

**866 G 3****Supervision Theory**

Su, A, Sp. 2 1½-hr. cl.

Prereq.: 861, or equiv.

An advanced course in supervision of instruction; kindergarten through the 12th grade. Galloway.

**867 G 2-5****Educational Experimentation**

Su, W. 1 2-hr. lab., conf. arr.

Prereq.: 785 or equiv., and 15 cr. hrs. of grad. work in Ed.

Repeatable to a maximum of 5 cr. hrs.

Analysis of contribution of selected experiments to elementary, secondary, and higher education; design of experimental method for attacking educational problems. Duncan.

**868 G 3****Laboratory in Curriculum Development in Secondary Schools**

Sp. 1 2½-hr. cl.

Prereq.: 862, or equiv.

An advanced course in techniques of curriculum development and organization; study of specific problems in curriculum development which are of concern to the students enrolled. Alberty.

**869 G 3****Instructional Theory**

Su, W. 1 2½-hr. cl.

Prereq.: 862 and 864.

An advanced course dealing with theoretical conceptions, basic principles, and generalized techniques involved in developing, executing, and evaluating instructional activities. Galloway.

**870 G 3****Practicum in Curriculum, Instruction, and Supervision**

A. 1 cl., lab. arr.

Prereq.: Master's degree and 861.

Not open to students with credit for 868.

A study of the literature and methods of curriculum, instruction, and supervision in a field setting, with emphasis on instruction. Hough.

**871 G 3****Practicum in Curriculum, Instruction, and Supervision**

W. 1 cl., lab. arr.

Prereq.: Master's degree, 860 or 861 or 864.

A study of the literature and methods of curriculum, instruction, and supervision in a field setting, with emphasis on supervision.

**872 G 3****Practicum in Curriculum, Instruction, and Supervision**

Sp. 1 cl., lab. arr.

Prereq.: Master's degree, 860 or 861, or equiv.

A study of the literature and methods of curriculum, instruction, and supervision in a field setting, with emphasis on curriculum. Klohr.

**873 G 3****Problems of Secondary School Supervision and Curriculum Development**

Su, A. 1 2½-hr. cl.

Prereq.: 860.

Not open to students with credit for 868.

An advanced course in supervision and curriculum development emphasizing problems involved in initiating and conducting change in the secondary school curriculum. Alberty.

**884 G 3-15****Planned Field Experience**

Prereq.: Permission of area adviser.

Planned professional teaching experience in a public school or other educational agency under supervision.

**884.36 Teacher Education and Instruction**

**884.40 History of Education and Comparative Education**

**884.41 Philosophy of Education**

**884.43 Radio and Television Education**

**884.46 Audiovisual Communication**

**884.49 Curriculum and Instruction**

**889 G 3-5****Practicum in Educational Communication**

W. 2 cl., 3-9 hrs. arr.

Repeatable to a maximum of 10 cr. hrs.

Observation, limited participation and functional analysis of production, distribution, and management operations in selected media centers, and broadcast facilities or film agencies. Tyler and Belland.

**911 G 3****Conceptions of Mind in Educational Theory**

A. 1 2½-hr. cl.

Prereq.: 640.73, or equiv.

A philosophical study of psychological concepts used to describe mental phenomena. Special attention is given to their use in the formation of educational theory. Smith.

**912 G 3****Epistemology and Education**

Su. 1 2½-hr. cl.

Prereq.: 640.73, or equiv.

A study of selected epistemological problems related to educational theory and practice. Reagan.

**913 G 3****Modern Trends in Educational Philosophy**

Su, A, W, Sp. 1 2½-hr. cl.

Prereq.: 640.73, or equiv.

A discussion of alternative philosophies and their implications for current educational theory. Reagan and Pratte.

**914 G 3****Religion and Public Education**

Su, Sp. 1 2½-hr. cl.

Prereq.: 640.73, or equiv.

Alternative conceptions of teaching sectarian religion in the public schools; present educational practices, court decisions and controversial proposals. Smith.

**915 G 3****Social Philosophies and Their Educational Bearings**

Su, W. 1 2½-hr. cl.

Prereq.: 640.73.

A study of social philosophies in terms of their significance for educational procedures and programs. Pratte.

**916 G 3****The Educational Philosophy of John Dewey**

Su, Sp. 1 2½-hr. cl.

Prereq.: 912, or equiv.

A systematic study of the writings of John Dewey in their bearings upon educational theory and practice. Pratte.

**917† G 3****Comparative Philosophy of Education**

1 2½-hr. cl.

Prereq.: 912, 913, or equiv.

A study of alternative philosophies of education and the speculative development of their implications for educational practice. Reagan.

**922† G 3****Problems in Curriculum and Instruction in Inner-City Schools**

3 cl.

Prereq.: 860, 861, or equiv.

An analysis of current problems and examination of related research in the field of curriculum and instruction in inner-city elementary and secondary schools.

**925 G 2-5****Seminars**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Students with permission of advisers may register for more than one section of 925 or for the same section two or more times.

Research problems in:

**925.36 Teacher Education and Instruction**

Su, Sp.

Cruickshank and Hough.

**925.40 History of Education and Comparative Education**

Su, A, W, Sp.

Mehl and Sutton.

**925.41 Philosophy of Education**

Su, A, W, Sp.

Pratte, Reagan, and Smith.

**925.43 Radio and Television Education**

Su, A, W.

Tyler.

**925.46 Audiovisual Communication**

W, Sp.

Belland.

**925.49 Curriculum and Supervision**

Su, A, W, Sp.

Duncan, Frymier, Kiohr, and Galloway.

**927 G 3****History of the Universities**

Su, W. 2 1½-hr. cl.

The university as an institution through 10 centuries; patterns of development in different countries; German, English, American contributions to the idea of the American university. Sutton.

**928 G 3****The History of Educational Thought: Ancient and Medieval**

A. 1 2½-hr. cl.

Prereq.: 640.72, or 640.71.

Study and analysis of the major educational theories of the ancient and medieval periods including the educational writings of Plato, Aristotle, and St. Augustine. Mehl.

**929 G 3****The History of Educational Thought: Modern**

Sp. 1 2½-hr. cl.

Prereq.: 640.72, or 640.71.

Study of the major educational theories since 1500 including Montaigne, Milton, Locke, and Rousseau and their influence on contemporary educational theory and practice. Mehl.

**937 G 3****Direct Experiences in Teacher Education**

Su, W. 3 cl.

Prereq.: Master's degree, college supervision of student teachers, or permission of instructor.

An analysis of student teaching and related direct experiences in teacher education with special emphasis on the theoretical basis, purposes, organization, curriculum patterns, evaluation, administration, and problems in the design of experiences. Cruickshank and Hough.

**941 G 5****Theories and Curricula of Higher Education**

Su, A. 2 2-hr. cl., 1 hr. arr.

A study of current theories of general education of representative and experimental college programs in the United States.

**944 G 5****Curriculum in Teacher Education**

Su, W. 2 2-hr. cl., 1 hr. arr.

Prereq.: 860, or permission of instructor.

Bases and development of curriculum in teacher education (process and product); comparative study of programs for the preparation of teachers; analysis of the implications of current research for programs of teacher education. Cruickshank.

**994 G 3-5****Group Studies**

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Advanced group studies on special problems in education.

**994.36 Teacher Education and Instruction****994.40 History of Education and Comparative Education****994.41 Philosophy of Education****994.43 Radio and Television Education****994.46 Audiovisual Materials of Instruction****994.49 Curriculum and Supervision****999 G Arr.****Research**

Su, A, W, Sp.

Refer to decimal subdivisions under 925.

Research for thesis or dissertation purposes only.

## Education: Early and Middle Childhood

Office: 202 Arps Hall, 1945 North High Street

**Professors** Emans (Chairman), Burr, Frazier, Harding, Huck, King, Languis, and Tomlinson; **Associate Professors** Bozeman, Cunningham, DeStefano, Kerber, Koste, Miller, Orr, Rentel, Schatz, Stull, Tewksbury, and Utterback; **Assistant Professors** Anderson, Fox, Gress, Haefele, Holt, O'Bruba, Prescott, Rolfe, Smith, Tutolo, and Williams; **Instructors** Styer and Tribble.

Child Development and Guidance: 460, 815, 821.

Children's Literature: 467, 817.

Early Childhood Education: 289.70, 294.70, 501, 594.70, 674, 692.70, 693.70, 694.70, 824, 825, 826, 884.70, 925.70, 994.70, 999.70.

General Elementary: 289.02, 294.10, 461, 585.10, 585.11, 585.12, 594.10, H599, 683, 684, 692.10, 693.10, 694.10, H799, 818, 819, 823, 829, 884.10, 923, 925.10, 994.10, 999.10.

Mathematics 502, 504, 812, 820.

Language Arts: 503, 507, 813.

Reading: 294.56, 503, 513, 594.56, 692.56, 693.56, 694.56, 732, 733, 827, 828, 854, 855, 884.56, 921, 925.56, 994.56, 999.56.

Science: 504, 511, 811, 920.

Social Studies: 505, 508, 814.

Abbreviations: Educational Development = Ed Devel  
Educational Special Services = Ed Sp Sv  
Education: Curriculum and Foundations = Ed: C & F  
Education: Early and Middle Childhood = E & MC

### 289

#### Field Experience

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Professional service with children or youth in some school or community agency.

289.02 Experience in a Community Agency U 2-5

289.70 Early Childhood Education U 2-3

### 294

#### U 3-5

#### Special Group Studies

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Group studies for students in specialized programs.

294.10 Elementary Education

294.56 Reading

294.70 Early Childhood Education

### 460

#### U 4

#### Elementary Education: Child Guidance

Su, A, W, Sp. Lab. arr.

Prereq.: Psych. 230; concur. 461.

Not open in Su. to elementary majors who lack teaching experience.

Lab. time is spent in observation-participation in an elementary school classroom.

To develop an understanding of child growth and development principles in relation to instruction.

### 461

#### U 3

#### Elementary Education: Conceptions of Teaching

Su, A, W, Sp.

Prereq. or concur.: 460.

Not open in Su. to elementary education majors who lack teaching experience.

The lab. for 460 also serves 461. (Students who enroll only in 461 because of previous credit for 460 will be assigned to an elementary classroom for observation and participation at the same time as the 460 lab.)

Designed to acquaint students with certain aspects of elementary school programs which cut across separate subject areas, and to acquaint students with certain teaching behaviors.

### 467

#### U 3

#### Introduction to Children's Literature

Su, A, W, Sp.

Prereq. or concur.: 461.

Study of literature for children with emphasis on standards for selecting materials with reference to the interests, needs, and abilities at different age levels.

### 501

#### U 3

#### Kindergarten and Preschool Teaching

Su, A, W, Sp.

Prereq.: 460; permission of instructor required for home economics majors.

Recent development in the education of young children and its influence on the selection and guidance of appropriate activities.

### 502

#### U 3

#### Elementary Education: Arithmetic

Su, A, W, Sp.

Prereq.: 461; Math. 105, and 106 or 107.

A study of the methods and materials used in arithmetic instruction; includes development of functional relationships with other curriculum areas, diagnostic procedures, and remedial work.

### 503

#### U 4

#### Concepts of Teaching: The Child and His Language

A, W. Field exp. arr.

Prereq.: Psych. 230, or equiv.

Not open to students with credit for Education 460, 461, 467, 502, 507, 508, 511, or 513. May not be taken concurrently with 504 or 505.

Focuses upon relating children's growth and acquisition of oral and written language to the school. Presentation of major concepts of language arts, reading, and children's literature.

### 504

#### U 4

#### Concepts of Teaching: The Child and His Physical Environment

A, Sp. Field exp. arr.

Prereq.: Psych. 230, or equiv.; 15 cr. hrs. of science; and Math. 105 and Math 106 or Math. 107. (10 cr. hrs. of college-level math. are acceptable as a substitute for Math. 105.)

Not open to students with credit for Education 460, 461, 467, 502, 507, 508, 511, or 513. May not be taken concurrently with 503 or 505.

Focuses upon relating child development principals to the physical environment of the child. Presentation of the major concepts of science and mathematics education.



**505 U 4****Concepts of Teaching:  
The Child and His Social Environment**

A. Field exp. arr.

Prereq.: Psych. 230, or equiv.

Not open to students with credit for Education 460, 461, 467, 502, 507, 508, 511, or 513. May not be taken concurrently with 503 or 504.

Examines the school in society. Emphasis is upon the classroom as an environment for social interaction. Focus on major concepts of social studies.

**507 U 3****Elementary Education: The Language Arts**

Su, A, W, Sp.

Prereq.: 461.

Consideration given to the teaching of language arts, including listening, oral, and written communications.

**508 U 4****Elementary Education: The Social Studies**

Su, A, W, Sp. Lab arr.

Prereq.: 461; concur. 513 should be scheduled on the same day of the week and at consecutive a.m. and p.m. hours just prior to student teaching.

Not open in Su. to elementary majors who lack teaching experience.

Lab. time is spent in participation in an elementary school.

Students may not schedule more than 20 cr. hrs. while taking this course.

Sequential arrangement of the elementary education curriculum. Particular emphasis is placed on social studies in the elementary school program.

**511 U 4****Elementary Education: Science**

Su, A, W, Sp. Lab arr.

Prereq.: 461, and 15 cr. hrs. of science. (The University Basic Education Requirement in science may be used.)

Consideration is given to the role of science in childhood education and to the study of content, methods, materials, and equipment appropriate for this program.

**513 U 4****Elementary Education: Reading**

Su, A, W, Sp. Lab. arr.

Prereq.: 461; concur. 508 should be scheduled on the same day of the week and at consecutive a.m. and p.m. hours just prior to student teaching.

Not open in Su. to elementary majors who lack teaching experience.

Lab. time is spent in participation in an elementary school.

Students may not schedule more than 20 cr. hrs. while taking this course.

A study of various methods and materials used in the teaching of reading in the elementary school today.

**585****Elementary Education Student Teaching**

A, W, Sp.

Prereq.: Ed. 4th yr. standing.

For additional information, see College of Education catalog.

Observation, participation, and responsible teaching in a public school in the Greater Columbus area; individual and group conferences or seminars. (Maximum transfer credit accepted is 6 cr. hrs.)

**585.10 Standard Elementary Student Teaching U 9, 12, or 15**

For students in the regular elementary education degree program. All students must enroll for 15 hours unless they have transfer credit for part of this requirement.

**585.11 In-Service Student Teaching U 6 or 9**

For approved students with 3 or more years of successful teaching experience.

**585.12 Postdegree Elementary Student Teaching U 12-15**

For students in the program for graduates with Bachelor of Arts or comparable degrees.

**594 U 3-5****Group Studies**

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Group studies for students in specialized programs.

**594.10 Elementary Education****594.56 Reading****594.70 Early Childhood Education****H599 U 3-5****Honors Course**

Su, A, W, Sp.

Prereq.: Enrollment in the Honors Achievement Program and permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

A program of accelerated study for students with special aptitudes.

**674 U G 3****Family Participation  
in Early Childhood School Programs**

Sp.

Prereq.: Ed Sp Sv 673, or permission of instructor.

Focuses upon the purposes and importance of family involvement in early childhood school programs, types of programs, resources, methods, and curricula.

**683 U G 3****Problems of Teachers in the Elementary School**

Su.

Prereq.: 585, or permission of instructor.

Course will be transferred to Education: Curriculum and Foundations by Summer Quarter.

To acquaint participants with the most frequent-severe problems reported by teachers; the role of a teacher is assumed in a classroom simulation.

**684 U G 3****Problems of Teachers  
in the Inner-City Elementary School**

Prereq.: 585, or permission of instructor.

Course will be transferred to Education: Curriculum and Foundations by Summer Quarter.

To acquaint participants with the most frequent-severe problems reported by teachers; the role of a teacher is assumed in a classroom simulation.

**690 U G 3****Practicum in Problems of Public Education**

Su, A, W, Sp. 3 cl.

Prereq.: 461 or equiv., Ed: C & F 435, and permission of instructor.

Repeatable to a maximum of 9 cr. hrs.

Open to experienced teachers and administrators; groups are organized around specific problems; requests must be received by department chairman in time to allow for planning.

**692 U G 3, 4, 6, or 8****Workshops**

Su. 4 cr. hrs. for 3-wk. workshops.

6 cr. hrs. for 4½-wk. workshops.

8 cr. hrs. for 6-wk. workshops.

Prereq.: Teaching experience, and permission of workshop director.

Repeatable to a maximum of 16 cr. hrs.

Intensive study of a problem common to the participants for the purpose of developing sound principles and practices relating to it.

**692.10 Elementary Education**

**692.56 Reading**

**692.70 Early Childhood Education**

**693 U G 1-4****Individual Studies**

Su, A, W, Sp.

Prereq.: 460 or Ed: C & F 435, and permission of instructor.

A total of not more than 30 cr. hrs. of Individual Study (any 693) will apply toward graduation for undergrad. students, or 45 cr. hrs. for grad. students.

**693.10 Elementary Education**

**693.56 Reading**

**693.70 Early Childhood Education**

**694 U G 3-5****Group Studies**

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Group studies on special problems in education.

**694.10 Elementary Education**

**694.56 Reading**

**694.70 Early Childhood Education**

**732 U G 3****Corrective Reading**

Su, A.

Prereq.: 513 or Ed: C & F 435, and Psych. 230.

Diagnostic techniques and instructional methods and materials useful to the elementary and secondary classroom teacher in helping individuals and small groups of problem readers.

**733 U G 3****Reading in the Secondary School**

Su, W, Sp.

Prereq.: Student teaching or permission of instructor.

Not open to students with credit for 853.

Critical study of objectives, content, and organization of reading programs in secondary schools.

**768**, Now in Education: Curriculum and Foundations, will be transferred to Education: Early and Middle Childhood by Summer Quarter.

**H799 U G 3-5****Honors Course**

Su, A, W, Sp.

Prereq.: Enrollment in the Honors Achievement Program and permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

A program of accelerated study and research for students with special aptitudes.

**811 G 3****Science in Elementary Education**

Su, A, Sp.

Prereq.: 585, or Secondary (587) student teaching, or 3 yrs. teaching experience.

Problems of elementary school science instruction with emphasis on pertinent literature and classroom implementation of current developments in science curriculum and methodology.

**812 G 3****Mathematics in Elementary Schools**

Su, A.

Prereq.: 585, or Secondary (587) student teaching, or 3 yrs. teaching experience.

Applications of research and theory to improve children's competence and problem solving; organization of instructional programs and contemporary instructional questions are considered.

**813 G 3****Language Arts in the Elementary School**

Su, A, W, Sp.

Prereq.: 585, or Secondary (587) student teaching, or 3 yrs. teaching experience.

Problems, research, and current methods of teaching the four major areas of the language arts in the elementary school; listening, speaking, reading, writing.

**814 G 3****Social Studies in the Elementary School**

Su, W.

Prereq.: 585, or Secondary (587) student teaching, or 3 yrs. teaching experience.

The educational values of social studies, reasons for and ways and means of integrating the social sciences with emphasis upon program innovations and research.

**815 G 3****Guidance Problems in the Elementary School**

Su, A, Sp.

Prereq.: 585 or Secondary (587) student teaching.

Selected problems which the elementary teacher faces in providing individual, small-group, and large-group guidance.

**817 G 3****Advanced Course in Children's Literature**

Su, A, W, Sp.

Prereq.: 467, or 813.

An evaluation of the changing role and increased importance of literature in the education of children and youth today.

**818 G 3****Foundations of Elementary Education**

Su, A, Sp.

Utilization of research in the basic sciences in developing background and understanding of present trends in elementary education; critical examination of current theories.

**819 G 3****The Changing American Elementary School**

Su, A, W.

Prereq.: 585, or Secondary (587) student teaching, or 3 yrs. teaching experience.

Involves investigation of objectives, issues, and curriculum organization of the modern elementary school program.

**820 G 3****Evaluation in Elementary Schools**

Su, Sp.

Prereq.: 585, or Secondary (587) student teaching, or 3 yrs. teaching experience.

Appraisal of materials and methods in terms of educational aims and research findings; consideration of instruments and procedures for comparing achievements with established objectives.

**821 G 3****School Problems in Child Development**

Su, W, Sp.

An advanced course based upon research in education and related fields which aids the teacher in guiding developmental activities of children in the elementary school.

**823 G 3****Creative Experiences in the Elementary School Curriculum**

Su, A, Sp.

Study of the nature of creativity and aesthetics as related to the elementary school curriculum.

**824 G 3****Designing School Programs for Children Age Two to Six**

Su, A.

A study of the characteristics and needs of children two to six years of age as they are related to the development of educational programs.

**825 G 3****Methods of Developing Language and Cognition in Early Childhood**

W.

Prereq.: 824, or permission of instructor.

Curriculum methods and materials in developing language and cognition in school programs for children ages three to eight, based upon research findings.

**826 G 3****Research in Early Childhood Education**

Sp.

Prereq.: Ed Devel 785 and 786, or permission of instructor.

Exploration of research methods and techniques related to early childhood school programs; review of research in the field; in-depth investigation of interest area.

**827 G 3****Advanced Study in the Teaching of Developmental Reading**

Su, A, W.

Designed to provide experienced teachers the opportunity to extend and update their knowledge of the reading process and the principles underlying effective reading instruction.

**828 G 3****Trends and Issues in Teaching Reading in the Elementary School**

Su, A, Sp.

Prereq.: 813, or permission of instructor.

Designed for experienced teachers and curriculum workers; current developments, trends, and issues critically analyzed according to available research evidence.

**829 G 3****Problems in Elementary School Curriculum and Supervision**

Su, A, Sp.

Prereq.: 819 and Ed: C & F 861.

An analysis of the programs and practices involved in facing major curriculum problems in the elementary schools; supervision and curriculum will be synthesized.

**854 G 3****Reading in Its Social Setting**

Sp.

The influence of culture on the nature, quality, and quantity of reading development; the relationship of reading to language development and mass media.

**855 G 3****Practicum in Reading**

Sp. Lab. arr.

Prereq.: Permission of instructor.

Application of research, diagnostic, prognostic, and program development methodology in field settings.

**884 G 3-15****Planned Field Experience**

Prereq.: Permission of area adviser.

Planned professional teaching experience in a public school or other educational agency under supervision.

**884.10 Elementary Education****884.56 Reading****884.70 Early Childhood Education****920 G 3****Advanced Concepts in Elementary School Science Education**

W.

Prereq.: 811, or permission of instructor.

Emphasis on functions of leadership personnel in developing and improving elementary school science programs and on evaluation of current developments and research.

**921 G 3****A Guided Survey of Research in Reading**

Sp.

Prereq.: 6 cr. hrs. in grad. reading courses.

Repeatable to a maximum of 6 cr. hrs.

Provides acquaintance with scientific studies relating to reading, methods used, results attained, including implications and limitations, and the problems meriting further investigation.

**923 G 3****Developing the Curriculum in Elementary Teacher Education**

Lab. arr.

Prereq.: Ph.D. standing, or permission of instructor.

To acquaint teachers of elementary teachers with processes of curriculum development in elementary teacher education; to permit them to consider models for preparation of elementary teachers.

**925 G 2-5****Seminars**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Students with permission of advisers may register for more than one section of 925 or for the same section two or more times.

**925.10 Elementary Education****925.56 Reading****925.70 Early Childhood Education****994 G 3-5****Group Studies**

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Advanced group studies on special problems in education.

**994.10 Elementary Education****994.56 Reading****994.70 Early Childhood Education****999 G Arr.****Research**

Su, A, W, Sp.

Refer to decimal subdivisions under 925.

Research for thesis or dissertation purposes only.

## Education for Exceptional Children

Office: 371 Arps Hall, 1945 North High Street

**Professors** Stephens (Chairman) and Huelsman; **Associate Professors** Beaber, Benson, Brittin, Cavin, Cotter, Collins, and Lema; **Assistant Professors** Anderson, Cooper, Engin, Hubbard, K. Hunt, Looney, Parks, and Umsted; **Instructors** Burns and Crawford.

General Exceptional: 289.02, 588.47, 594.47, H599, 651, 658, 665, 692.47, 693.47, 694.47, H799, 847, 848, 884.47, 925.47, 994.47, 999.47.

Learning and Behavioral Disorders: 692.62, 693.62, 694.62, 718, 770, 771, 772, 773, 774, 775, 846, 884.62, 885.62, 925.62, 994.62, 999.62; Psych. 682.

Visually Handicapped: 588.52, 666, 667, 668, 669, 692.52, 693.52, 694.52, 717, 719, 884.52, 885.52, 925.52, 994.52, 999.52.

Child Study: 693.61, 694.61, 884.61, 925.61, 986, 987, 988, 989, 990, 991, 992, 994.61, 999.61.

Deaf and Hard of Hearing: 659, 660, 661, 693.55, 712, 713, 714, 884.55, 885.55, 925.55, 994.55, 999.55.

Educational Disability: 651, 670, 671, 693.64, 884.64, 925.64, 999.64.

Gifted: 884.66, 925.66.

Mental Retardation: 588.54, 652, 653, 654, 655, 656, 657, 692.54, 693.54, 694.54, 773, 774, 775, 884.54, 885.54, 925.54, 994.54, 999.54; Psych. 857.

Physically Handicapped: 588.60, 715, 999.60.

Speech and Hearing Therapy: 289.04, 588.04, 662, 663, 693.04, 776.

Abbreviations: Education: Curriculum and Foundations = Ed: C & F  
Education: Early and Middle Childhood = Ed: E & MC  
Education for Exceptional Children = Ed Excep

**289****Field Experience**

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Professional service with children or youth in some school or community agency.

**289.02 Experience in a Community Agency U 2-5****289.04 Speech and Hearing Therapy U 3**

For students in the speech and hearing therapy curriculum.

**588 U 3-15****Student Teaching in Special Fields**

Su, A, W, Sp.

Prereq.: Ed. 4th yr. standing.

A minimum of 12 cr. hrs. in student teaching is required.

For additional information, see College of Education catalog.

**588.04 Speech and Hearing Therapy****588.47 Exceptional Children****588.52 Blind and Partially Seeing****588.54 Educable Mentally Retarded****588.60 Physically Handicapped****594 U 3-5****Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Group studies for students in specialized programs.

**H599 U 3-5****Honors Course**

Su, A, W, Sp.

Prereq.: Enrollment in the Honors Achievement Program and permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

A program of accelerated study for students with special aptitudes.

**651 U G 3****Introduction to Exceptional Children**

Su, A, W, Sp. 1 2½-hr. cl.

Prereq.: Permission of instructor.

Not open to students with credit for Psych. 570.

Exceptional children and their problems, including the intellectual deviant, visually handicapped, deaf and hard of hearing, children with speech problems, physically handicapped, and emotionally disturbed. Anderson.

**652 U G 3****The Educable Mentally Retarded: Introduction**

Su, A, W, Sp. 1 2½-hr. cl.

Prereq.: 651 or Psych. 570.

Study of causal factors, evaluation, learning potential, and general characteristics of the retarded child. Anderson.

**653 U G 3****Educational Planning for Mentally Retarded Children and Youth**

Su, A, W, Sp.

Prereq.: 652.

A basic course for teachers and administrators which deals with curriculum goals and related educational planning for mentally retarded children and youth. Anderson, Beaber, and Lema.

**654 U G 3****Practicum in Educational Planning for Mentally Retarded Children: Communicative Arts**

Su, A, W, Sp. 1 2½-hr. cl.

Prereq.: 652 and 653.

A practicum on content, educational techniques, and methodology of teaching the communicative arts to the mentally retarded. Beaber.

**655 U G 3****Practicum in Education Planning for Mentally Retarded Children: Arithmetic**

Su, A, W, Sp. 1 2½-hr. cl.

Prereq.: 653.

A practicum on content, educational techniques, and methodology of teaching arithmetic to the mentally retarded. Beaber.

**656 U G 3****Practicum in Educational Planning for Mentally Retarded Children: Natural and Social Science**

Su, A, W, Sp. 1 2½-hr. cl.

Prereq.: 653.

A practicum on content, educational techniques, and methodology of teaching the natural and social sciences for the mentally retarded. Lema.

**657 U G 3****Curriculum Planning for Occupational Training of the Mentally Retarded**

Su, A, W, Sp. 3 cl.

Prereq.: 653.

A curriculum planning course studying the purpose, organization and administration of sheltered workshops and other work experience programs for the mentally retarded. Calvin and Swassing.

**658 U G 3****Education for the Slow Learner**

A. 3 cl.

Prereq.: 15 hrs. in elementary or secondary education.

A critical examination of the educational problems of the slow learner with recommendations for organization of curriculum and programs to meet their needs.

**659 U G 3****Techniques of Teaching Speech to the Deaf**

W. 1 2½-hr. cl.

Study and practice in developing speech in the deaf. Looney.

**660 U G 3****Techniques of Developing Language in the Deaf**

A. 1 2½-hr. cl.

Prereq.: 651 or Psych. 570.

A study of the techniques and procedures for developing elementary vocabulary and syntax for deaf children. Looney.

**661 U G 3****Techniques of Developing Advanced Language in the Deaf**

W. 1 2½-hr. cl.

Prereq.: 660.

Study of techniques and procedures for developing advanced vocabulary and syntax with deaf students. Collins.

**662 U G 3****Methods in School Speech and Hearing Therapy**

A, Sp. 1 3-hr. cl.

Prereq.: 289.04.

Organizing speech and hearing therapy programs in schools; state programs; professional relationships; procedures and materials for screening, scheduling, lesson planning, and evaluation.

**663 U G 3****Advanced Methods in School Speech and Hearing Therapy**

A, W. 1 3-hr. cl.

Prereq.: 662.

Advanced therapy methods and techniques for the treatment of complex speech, language, and hearing problems encountered by the school speech and hearing therapist.

**665 U G 3****Instructional Programs for Exceptional Children**

W. 1 2½-hr. cl.

Prereq.: Practice Teaching.

Problems, evaluation, and adjustments related to the participation of exceptional children in the regular classroom, grades one through 12. Lema.

**666 U G 3****Principles and Methods of Teaching Braille: Beginning**

Su, A. 3 cl.

Theory and practice in learning and teaching braille reading and writing, including the alphabet, numerals, twenty-six one-cell whole-word signs and seventeen dot-five compound contractions. Hott.

**667 U G 3****Principles and Methods of Teaching Braille: Advanced**

Su, W. 1 2½-hr. cl.

Prereq.: 666.

Theory and practice in learning and teaching braille reading and writing with emphasis on contractions, punctuation, and manuscript writing; preparation for certification in braille writing. Hott.

**668 U G 3****Principles and Methods in the Education of Partially Seeing Children**

Su, W. 1 2½-hr. cl.

Prereq.: 717.

Identification of types and patterns of visual impairments; educational placement, facilities, and programs for the partially seeing; impact of visual environment on sight; use of special equipment for partial seeing.

**669 U G 3****Practicum in Educational Planning for Partially Seeing Children**

Su, Sp. 1 2½-hr. cl.

Prereq.: 668.

Adaptations of curriculum for the partially seeing—methods and techniques; planning educational experiences; counseling and guidance for the partially seeing; observation and participation required.

**670 U G 3****Educational Disability**

Su, A. 1 2½-hr. cl.

Prereq.: Ed: E &amp; MC 507, or permission of instructor.

Not open to students with credit for Psych. 681.

An overview of theory and practice, including causes, diagnostic procedures, remediation, and instructional materials. Huelsman.

**671 U G 3****Psycho-Educational Diagnostic Teaching**

Su, W, Sp. 1 2-hr. cl., 3 1-hr. lab. arr.

Prereq.: Permission of instructor.

Not open to students with more than 6 cr. hrs. of Psych. 683.

Repeatable to a maximum of 9 cr. hrs.

Using test materials in the diagnosis of special disabilities in school work; practice with remedial procedures. Huelsman.

**692 U G 4, 6, or 8****Workshops**

Su. 4 cr. hrs. for 3-wk. workshops.

6 cr. hrs. for 4½-wk. workshops.

8 cr. hrs. for 6-wk. workshops.

Prereq.: Teaching experience, and permission of workshop director.

Repeatable to a maximum of 16 cr. hrs.

Intensive study of a problem common to the participants for the purpose of developing sound principles and practices relating to it.

**692.47 Exceptional Children****692.52 Blind and Partially Seeing****692.54 Educable Mentally Retarded****692.62 Learning and Behavioral Disorders****693 U G 1-4****Individual Studies**

Su, A, W, Sp.

Prereq.: Ed: C &amp; F 435 or Ed: E &amp; MC 460, and permission of instructor.

A total of not more than 30 cr. hrs. of Individual Study (any 693) will apply toward graduation for undergrad. students, or 45 cr. hrs. for grad. students.

**693.04 Speech and Hearing Therapy****693.47 Exceptional Children****693.52 Blind and Partially Seeing****693.54 Educable Mentally Retarded****693.55 Deaf and Hard of Hearing****693.61 Child Study****693.62 Learning and Behavioral Disorders****693.64 Educational Disability****694 U G 3-5****Group Studies**

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Group studies on special problems in education.

**694.47 Exceptional Children****694.52 Blind and Partially Seeing****694.54 Educable Mentally Retarded****694.61 Child Study****694.62 Learning and Behavioral Disorders****712 U G 3****Evolution of Instruction and Guidance of the Deaf**

W. 1 2½-hr. cl.

Prereq.: 651, or Psych. 570.

Evolution of the oral and manual approaches of instruction of the deaf and their implication for the life adjustment problems of the deaf. Collins and Looney.

**713 U G 4****Teaching Reading and Arithmetic to the Deaf**

W. 4 cl.

Prereq.: 660.

Developing skills in reading and arithmetic in the deaf. Looney.

**714 U G 3****Teaching Social Studies and Science to the Deaf**

Sp. 3 cl.

Prereq.: 713.

Teaching skills in academic subjects to the deaf on the intermediate and high school levels. Collins.

**715 U G 3****Education of Multihandicapped Children**

A, Sp. 1 2½-hr. cl.

Prereq.: 651, or Psych. 570.

Differential diagnosis, classification, educational placement, and adjustment of multihandicapped children Benson.

**717 U G 3****Educational Implication of Visual Impairments**

Su, A. 1 2½-hr. cl.

Prereq.: 651, or Psych. 570.

A course for school personnel, including a survey of the structure, function, and hygiene of the eyes with emphasis on educational implications of visual disabilities of blind and partially seeing children.

**718 U G 3****Introduction to Socially and Emotionally Handicapped**

Su, A, W, Sp. 1 2½-hr. cl.

Prereq.: Permission of instructor.

Identification, overview of educational treatments, social behavior problems in the school, educational placements, certification, funding, and trends. K. Hunt.

**719 U G 3****Theory and Practice in the Education of the Blind Children**

Su, Sp. 1 2½-hr. cl.

Prereq.: 717.

Current theories and techniques in the education of blind children; adapting general curriculum, specialized content, materials, and equipment for the blind child.

**770 U G 3****Introduction to Learning Disabilities**

Su, A, W, Sp. 1 2½-hr. cl.

Prereq.: Permission of instructor.

Education treatments, social problems in schools, overview of educational treatments, educational placements, certification, funding and trends. Hubbard and Parks.

**771 U G 6****Exceptional Children: Assessment and Instruction**

A, W, Sp. 3 cl., 3 lab.

Prereq.: 718 or 770, and 772; permission of instructor.

Application of behavioral technology to children with learning and behavioral disorders in clinical settings. Stephens.

**772 U G 3****Applying Behavioral Approaches in the Classroom**

Su, A, W, Sp. 1 2½-hr. cl.

Prereq.: 718 or 770, and permission of instructor.

Classroom management problems, classroom engineering, assessment for teaching and roles of key people in a behavioral model designed for children with learning and behavior disorders. K. Hunt.

**773 U G 3****Directive Teaching of Exceptional Children**

A, W, Sp.

Prereq.: 718 or 770, and permission of instructor.

Principles of behavior and their application. Cooper.

**774 U G 3****Applied Behavioral Analysis of Exceptional Children**

A, W, Sp.

Prereq.: 718 or 770, 773, and permission of instructor.

Designed to help students develop skills in directive teaching with exceptional children. Cooper.

**775 U G 3****Observation Study of Exceptional Children**

W.

Prereq.: 718 or 770, 773, and permission of instructor.

Measurement and evaluation techniques, research designs, geared to teacher application in the classroom. Cooper.

**776 U G 3****Language Learning Disorders**

A, Sp. 3 cl.

Prereq.: 651, or permission of instructor.

Language learning disorders of neurologically impaired children; differential diagnosis of these communicative disorders; educational methods and materials for language development. Brittin.

**H799 U G 3-5****Honors Course**

Su, A, W, Sp.

Prereq.: Enrollment in the Honors Achievement Program and permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

A program of accelerated study and research for students with special aptitudes.

**846 G 3****Behavioral Approaches in Schools**

W, Sp. 1 1½-hr. cl., lab. arr.

Prereq.: 771, and permission of instructor.

Repeatable to a maximum of 6 cr. hrs.

Focuses on consulting with teachers of learning and behaviorally handicapped children; a systems approach is stressed; students devise and monitor instructional systems which are implemented with groups of children.

**847 G 3****Preparation of Handicapped Children for Post-School Adjustment**

W. 1 2½-hr. cl.

Prereq.: 651, or Psych. 570.

Study of the roles of education, guidance, work experience, placement, and follow-up service in helping handicapped children adjust to employment, family, and community life. Swassing.

**848 G 3****Organization of Programs for Exceptional Children**

A, W, Sp. 2 1½-hr. cl.

Prereq.: 651 and permission of instructor.

Major trends and issues in the organization and management of programs for exceptional children.

**884 G 3-15****Planned Field Experience**

Prereq.: Permission of area adviser.

Planned professional teaching experience in a public school or other educational agency under supervision.

884.47 Exceptional Children

884.52 Blind and Partially Seeing

884.54 Educable Mentally Retarded

884.55 Deaf and Hard of Hearing

884.61 Child Study

884.62 Learning and Behavioral Disorders

884.64 Educational Disability

884.66 Gifted

**885 G 3-6**  
**Supervised Teaching in Special Education**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Not open to students with credit for 710.

Repeatable to a maximum of 12 cr. hrs.

Student teaching for qualified students in the area of special education.

**885.52 Blind and Partially Seeing**  
 Hunt.

**885.54 Educable Mentally Retarded**

**885.55 Deaf and Hard of Hearing**

**885.62 Learning and Behavioral Disorders**

**925 G 2-5**

**Seminars**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Students with permission of advisers may register for more than one section of 925 or for the same section two or more times.

Research problems in:

**925.47 Exceptional Children**

A, W, Sp.

**925.52 Blind and Partially Seeing**

**925.54 Educable Mentally Retarded**

A, W, Sp.

**925.55 Deaf and Hard of Hearing**

A, Sp.

**925.61 Child Study**

A, W, Sp.

**925.62 Learning and Behavioral Disorders**

A.

**925.64 Educational Disability**

**925.66 Gifted**

**986 G 3**

**Developmental Assessment I**

A. 1 3-hr. cl.

Prereq.: Permission of instructor.

Use of testing and observational techniques in developmental assessment with major emphasis on collecting and evaluating data related to global cognitive and affective functioning. Engin.

**987 G 3**

**Developmental Assessment II**

W. 1 3-hr. cl.

Prereq.: Permission of instructor.

Continuation of 986, with emphasis on the techniques developed to assess specific abilities and disabilities for educational planning. Engin.

**988 G 3**

**Developmental Assessment III**

Sp. 1 3-hr. cl.

Prereq.: Permission of instructor.

Continuation of 987, with emphasis on the analysis, synthesis, and interpretation of data. Engin.

**989 G 3**

**Developmental Assessment IV**

Su. 1 3-hr. cl.

Prereq.: Permission of instructor.

Continuation of 988, with emphasis on intervention and the evaluation of intervention techniques. Engin.

**990 G 2**

**Supervised Practice in Developmental Assessment**

Su, A, W, Sp.

Prereq.: Permission of instructor; must be taken concurrently with one of the following: 986, 987, 988, or 989.

Repeatable to a maximum of 10 cr. hrs.

Within a school setting, under close supervision, students assess limited numbers of children, emphasizing global techniques, specific techniques, educational planning, and counseling with children, teachers, and parents.

**991 G 3**

**The School Psychologist in American Schools**

Su. 1 3-hr. cl.

Prereq.: Permission of instructor.

Overview of trends and issues confronting the professional school psychologist; establishing and maintaining a program of school psychological services. Engin.

**992 G 3, 6, 9, or 12**

**Internship in Child Study**

A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 36 cr. hrs.

Limited to selected Ph.D. and post-master's students majoring in school psychology; the student, staff member, and local school supervisor plan these professional experiences. Engin and Huelsman.

**994 G 3-5**

**Group Studies**

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Advanced group studies on special problems in education.

**994.47 Exceptional Children**

**994.52 Blind and Partially Seeing**

**994.54 Educable Mentally Retarded**

**994.55 Deaf and Hard of Hearing**

**994.61 Child Study**

**994.62 Learning and Behavioral Disorders**

**999 G Arr.**

**Research**

Su, A, W, Sp.

Refer to decimal subdivisions under 925.

Research for thesis or dissertation purposes only.

## Education: Humanities

Office: 238 Arps Hall, 1945 North High Street

**Professors** Jewett (Chairman), Allen, Gilliom, Lewis, Muessig, Otto, and Zidonis; **Associate Professors** Bateman, Stewart, and Woodruff; **Assistant Professors** Jarvis and Mertz.



English Education: 289.02, 294.25, 560, 561, 587.25, 594.25, H599, 612, 613, 614, 693.25, 694.25, H799, 884.25, 925.25, 970, 971, 972, 994.25, 999.25.

Foreign Language Education: 289.02, 294.45, 540, 586, 587.45, 594.45, H599, 616, 617, 618, 619, 692.45, 693.45, 694.45, H799, 839, 884.45, 925.45, 962, 963, 994.45, 999.45.

Social Studies Education: 289.02, 294.28, 526, 587.28, 594.28, H599, 624, 689, 692.28, 693.28, 694.28, H799, 882, 883, 884.28, 925.28, 982, 983, 984, 985, 994.28, 999.28.

Speech Education: 289.02, 289.09, 294.09, 442, 556, 587.09, 588, 594.09, H599, 631, 692.09, 693.09, 694.09, H799, 884.09, 925.09, 994.09, 999.09.

Abbreviations: Education: Curriculum and Foundations = Ed: C & F  
Education: Early and Middle Childhood = Ed: E & MC  
Education: Humanities = Ed: Hums

## 289 U 2-5

### Field Experience

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Professional service with children or youth in some school or community agency.

**289.02 Experience in a Community Agency**

**289.09 Speech and Radio-Speech**

For students in the curricula Speech and Radio-Speech.

## 294 U 3-5

### Special Group Studies

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Group studies for students in specialized programs.

**294.09 Speech Education**

**294.25 Teaching of English**

A, W, Sp.

**294.28 Teaching of Social Studies**

**294.45 Teaching of Foreign Languages**

## 442 U 3

### Creative Dramatics

Su, A, W, Sp. 3 cl. and lab.

Prereq.: Psych. 230, or equiv.

Philosophy, materials, methods, and evaluation of dramatic improvisation in developing creative artistic expression and problem solving.

## 526 U 4

### Teaching of Secondary Social Studies

Su, A, W, Sp. 2 2-hr. cl.

Prereq.: Ed: C & F 435.

Theory and practice in secondary social studies concerned with objectives, content, methods, materials, evaluation, and the utilization of history and the social sciences in the secondary school. Recent trends in the field.

## 540 U 4

### The Teaching of Modern Foreign Language I

A, Sp. 2 2-hr. cl.

Prereq.: Ed: C & F 435, and permission of instructor.

Repeatable to a maximum of 8 cr. hrs.; subdivisions not repeatable.

Study of the preparation and use of new instructional materials for beginning foreign language classes; the teaching of language skills and culture; evaluation.

a. A, Sp. French.

b. A, W, Sp. Spanish

c. A. German.

## 556 U 4

### The Teaching of Speech in Secondary Schools

Su, A, Sp. 4 cl.

Prereq.: Ed: C & F 435 and Speech Communication 240, 305 and 505.

The relationship of speech to the total school program with special emphasis on fundamental processes and forensic activities.

## 560 U 4

### Teaching the Reading of Literature

Su, A, W, Sp. 4 cl.

Prereq.: Ed: C & F 435.

The objectives of the literature program and techniques for developing appreciation and improving skills in the reading of various types of prose and poetry.

## 561 U 4

### Teaching Language and Composition in Secondary Schools

Su, A, W, Sp. 4 cl.

Prereq.: Ed: C & F 435.

The role of grammar and linguistics in the English program and techniques for the teaching of oral and written expression in high school.

## 586 U 3-7

### Elementary School Student Teaching in Foreign Languages

A, W, Sp.

## 587 U 3-15

### Student Teaching in Secondary Schools

Prereq.: Ed. 4th yr. standing.

A minimum of 15 cr. hrs. is required.

For additional information, see College of Education catalog.

Observation, participation, and responsible teaching in a public school in the Greater Columbus area; individual and group conferences or seminars. Students desiring teaching in more than one area should indicate accurately both section numbers and hours in each.

**587.09 Speech Education**

556 is prereq. for 587.09.

**587.25 English**

**587.28 Social Studies**

**587.45 Foreign Languages**

a. French

b. Spanish

c. German

d. Russian

e. Latin

f. English

## 588 U 3-15

### Student Teaching in Radio-Speech Education

Su, A, W, Sp.

Prereq.: 556 and 4th yr. standing in Ed.

A minimum of 15 cr. hrs. (9 hrs. in 587.09 and 6 hrs. in 588) in student teaching is required.  
For additional information, see College of Education catalog.

**594 U 3-5****Group Studies**

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Group studies for students in specialized programs.

**594.09 Speech Education**

**594.25 Teaching of English**

**594.28 Teaching of Social Studies**

**594.45 Teaching of Foreign Languages**

**H599 U 3-5****Honors Course**

Su, A, W, Sp.

Prereq.: Enrollment in the Honors Achievement Program and permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

A program of accelerated study for students with special aptitudes.

**612 U G 3****Linguistic Materials for High School Teachers**

Su, A, W, Sp. 1 2½-hr. cl.

A study of traditional and modern linguistics systems of grammar and their bearing on the work of the English teacher.

**613 U G 3****Literature for Adolescents**

Su, A, W, Sp. 2 1½-hr. cl.

Literature for individual, group and whole-class reading in junior and senior high schools; interest factors, readability, and literary value as criteria for selection; bibliographic aids.

**614 U G 3****The Supervision of Journalism in Secondary Schools**

Su, W. 1 cl.

Prereq.: Ed: C & F 435 or equiv., and Jour. 204.

For journalism teachers in secondary schools and advisers; covers editorial, advertising, circulation, mechanical production, and publishing phases of school newspapers, magazines, and annuals.

**616 U G 4****The Teaching of Modern Foreign Language II**

Su, A, W, Sp. 2 2-hr. cl.

Prereq.: 540 and Ed: C & F 485, and permission of instructor.

Repeatable to a maximum of 8 cr. hrs.; subdivisions not repeatable.

Study of the use of new instructional materials for intermediate and advanced foreign language classes; teaching of reading, writing, literature, and culture; evaluation.

- a. French.
- b. Spanish.
- c. German.
- d. Russian.
- e. English.

**617 U G 4****The Teaching of Foreign Languages in the Elementary School**

A.

Prereq.: 15 cr. hrs. of Ed. and permission of instructor.

Skill development in teaching of spoken and written foreign languages on the elementary school level; construction and use of suitable materials. Otto.

**618 U G 4****The Teaching of Latin**

A. 3 cl., lab. arr.

Prereq. or concur.: Ed: C & F 435, Latin 201, 202, and an additional 6 cr. hrs. in Latin.

Content of this course includes: values, teachers' equipment, objectives, and methods; classroom procedures; lectures, and assigned readings.

**619 U G 12-15****Foreign Language Education Residence in Europe**

Sp.

Prereq.: Permission of instructor; preregistration Autumn Quarter.

Repeatable to a maximum of 30 cr. hrs. if different countries are involved.

Practicum in language, language teaching, history, and culture in a foreign country; each student lives with a family, participates in instruction-related activities and in the study of social and cultural differences. Woodruff.

**624 U G 3****Social Education**

Su, A, W. 1 2½-hr. cl.

Prereq.: Ed: C & F 435 or Ed: E & MC 461, or permission of instructor.

Analyses of social structures and processes in classroom grouping arrangements; teacher social roles, school traditions, ceremonies, clubs, and athletics. Jewett.

**631 U G 4****Teaching Dramatics and Oral Interpretation in Secondary Schools**

Su, W. 4 cl.

Prereq.: Ed: C & F 435, and Speech Communication 221, Theatre 220, 280, 285, and 501.

The organization and conduct of dramatic classes and extra dramatic activities; resource planning for oral readings, choral speaking, radio-television programming, and theatrical production. Lewis.

**689 U G 1-15****Study Tour of Foreign Schools and Culture**

Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 25 cr. hrs. when different areas or topics are studied.

Five weeks intensive study of educational and cultural topics fundamental to central purpose of tour, then equal period of supervised observation of schools and related cultural factors in one or more foreign countries; specific emphases of separate tours to be announced.

**692 U G 4, 6, or 8****Workshops**

Su. 4 cr. hrs. for 3-wk. workshops.  
6 cr. hrs. for 4½-wk. workshops.  
8 cr. hrs. for 6-wk. workshops.

Prereq.: Teaching experience and permission of workshop director.

Repeatable to a maximum of 16 cr. hrs.

Intensive study of a problem common to the participants for the purpose of developing sound principles and practices relating to it.

**692.09 Speech**

**692.28 Social Studies**

**692.45 Foreign Language Education**

**693 U G 1-4****Individual Studies**

Su, A, W, Sp.

Prereq.: Ed: C & F 435 or Ed: E & MC 460, and permission of instructor.

A total of not more than 30 cr. hrs. of Individual Study (any 693) will apply toward graduation for undergrad. students, or 45 cr. hrs. for grad. students.

**693.09 Speech Education**

**693.25 Teaching of English**

**693.28 Teaching of Social Studies**

**693.45 Teaching of Foreign Languages**

**694 U G 3-5****Group Studies**

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Group studies on special problems in education.

**694.09 Speech Education**

**694.25 Teaching of English**

**694.28 Teaching of Social Studies**

**694.45 Teaching of Foreign Languages**

**H799 U G 3-5****Honors Course**

Su, A, W, Sp.

Prereq.: Enrollment in the Honors Achievement Program and permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

A program of accelerated study and research for students with special aptitudes.

**839 G 3****Applied Linguistics in the Teaching of Foreign Languages**

W, Sp. 2 1½-hr. cl.

Prereq.: 15 cr. hrs. in Ed., and at least one French or Span. course on the 600 level.

Analysis of research in applied linguistics; construction of drills, laboratory exercises, and tests; lexical items and structural inventory of French or Spanish. Allen.

a. W. French

b. Sp. Spanish

**882† G 3****Materials and Methods in the Social Studies**

W. 1 2½-hr. cl.

Study of recent innovations in teaching methodology in the social studies; review and evaluation of recently published teaching materials. Gilliom.

**883 G 5****Organization and Teaching of Social Studies**

A. 2 cl. and 2 2-hr. lab.

Prereq.: Ph.D. standing in College of Education.

Study of problems encountered in the conceptualization, planning, and teaching of the secondary social studies methods course. Gilliom.

**884 G 3-15****Planned Field Experience**

Prereq.: Permission of area adviser.

Planned professional teaching experience in a public school or other educational agency under supervision.

**884.09 Speech Education**

A, W, Sp.

**884.25 Teaching of English**

W.

**884.28 Teaching of Social Studies**

**884.45 Teaching of Foreign Languages**

W.

**925 G 2-5****Seminars**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Students with permission of advisers may register for more than one section of 925 or for the same section two or more times.

Research problems in:

**925.09 Speech Education**

Su. Theory and Practice in Forensics.

A. The Basic College Speech Course. Makay.

A. Modern Trends in Speech Education. Lewis.

W. Creative Drama and Children's Theatre. Lewis.

Sp. Speech Facilities and Resources. Lewis.

**925.25 Teaching of English**

Su, A.

**925.28 Teaching of Social Studies**

Su, A, W, Sp.

Gilliom, Jewett, and Muessig.

**925.45 Teaching of Foreign Languages**

Su, A, Sp.

Otto and Jarvis.

**962 G 4****Seminar in Foreign Language Education**

Sp. 1 3-hr cl.; 1 lab. arr.

Prereq.: Permission of instructor.

Analysis of major research studies and projects in the teaching and learning of foreign languages; evaluation and implications of findings. Allen and Otto.

**963 G 4****Foreign Language Testing**

Su, W. 2 2-hr. cl.

Prereq.: Permission of instructor.

Theory and practice of foreign language test construction including item writing, item analysis, reliability, validity, scoring, and interpretation. Jarvis.

**970 G 3****The English Curriculum: Language and Composition**

Su, W. 3 cl.

Prereq.: 20 cr. hrs. in Ed., and 25 cr. hrs. in English.

An evaluation of current trends and developments in linguistics and composition instruction and their relevance for the English curriculum.

**971 G 3****The English Curriculum: Literature**

Su, Sp. 1 2½-hr. cl.

Prereq.: 20 cr. hrs. in Ed., and 25 cr. hrs. in English. Critical examination of trends in the secondary school literature program, including programs for the able and the disadvantaged student, basic objectives, types of organization, technique of developing literary appreciation.

**972 G 3****The English Curriculum: Studies in the Teaching of Literature**

Su, W. 1 2½-hr. cl.

Prereq.: 20 cr. hrs. in Ed., and 25 cr. hrs. in English; familiarity with contemporary critical thought. Role of literary theory and aesthetics in English curriculum development; study of the relation of literature to the other arts. Stewart.

**982 G 3****Evaluation in Secondary Social Studies Education**

A. 1 2½-hr. cl.

Prereq.: Certification in secondary social studies. Admission to grad. program in secondary social studies. A seminar concerned with testing, measurement, and evaluation in secondary social studies; treatment of teacher-made standardized tests; discussion of reporting practices. Muessig.

**983† G 3****Research in Secondary Social Studies Education**

1 2½-hr. cl.

Prereq.: Certification in secondary social studies. Admission to doctoral program in secondary social studies.

A seminar devoted to research needs, problems, procedures, and findings in secondary social studies; designed to aid doctoral candidates with the selection and implementation of their studies. Muessig.

**984 G 3****Curriculum Theory and Development in Secondary Social Studies Education**

Su, W. 1 2½-hr. cl.

Prereq.: Certification in secondary social studies. Admission to grad. program (master's or doctoral) in secondary social studies. Seminar devoted to curriculum theory and development in secondary social studies education; simulation experience where participants build a secondary social studies program. Muessig.

**985 G 3****Theories of Secondary Social Studies Education**

Sp. 1 2½-hr. cl.

Prereq.: Certification in secondary social studies. Admission to doctoral program in secondary social studies.

A seminar devoted to basic theories of secondary social studies education; discussion of subject-centered, emergent needs, citizenship, reflective, and discipline-oriented approaches. Muessig.

**994 G 3-5****Group Studies**

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Advanced group studies on special problems in education.

**994.09 Speech Education**

**994.25 Teaching of English**

**994.28 Teaching of Social Studies**

**994.45 Teaching of Foreign Languages**

**999 G Arr.****Research**

Su, A, W, Sp.

Refer to decimal subdivisions under 925.

Research for thesis or dissertation purposes only.

**Education: Industrial Technology**

Office: 202 Oxley Hall, 1712 Neil Avenue

**Professors** Lux (Chairman), Buffer, and Ray; **Assistant Professors** Blankenbaker, Hoffman, Pratzner, and Umstattd.

Courses: 120, 220, 221, 222, 224, 225, 227, 228, 231, 232, 235, 236, 243, 251, 255, 289, 294, 355, 436, 437, 438, 532, 533, 534, 587, 594. H599, 610, 692, 693, 694, H799, 832, 833, 834, 835, 836, 837, 884, 925, 994, 999.

Abbreviations: Education: Curriculum and Foundations = Ed: C & F  
Educational Development = Ed Devel  
Education: Early and Middle Childhood = Ed: E & MC  
Education: Industrial Technology = Ed: Intec

**120 U 4****Industrial Practices and the School**

A, W, Sp. 5 2-hr. cl. and lab.

A study of the history and role of industrial technology and its relation to the school through experiences in planning, organizing, and controlling a managed production system.

**220 U 3****Design of Constructed and Manufactured Goods**

A, W, Sp. 2 2-hr. cl. and lab.

Prereq.: Engr. Gr. 121.

A study of historical and contemporary design technology as it is applied in the construction and manufacturing industries.

**221 U 4****Manufacturing Practices I**

A, W, Sp. 5 2-hr. cl. and lab.

Prereq.: 120 and 220.

A study of basic concepts of manufacturing technology through experiences in forming, separating, combining, and assembling materials used in the production of manufactured goods.

**222 U 4****Manufacturing Practices II**

A, W, Sp. 5 2-hr. cl. and lab.

Prereq.: 221.

A study of manufacturing management technology, manufacturing production technology, and manufacturing personnel technology through experiences in planning, engineering, and production of selected manufactured goods.

**224 U 4****Mechanical Systems and Servicing**

Su, A, W, Sp. 5 2-hr. cl. and lab.

Prereq.: 120.

A study of the fundamental knowledge of techniques necessary for the application of mechanical power systems to industrial activities and the practices of servicing mechanical power systems.

**225 U 4****Transmitting and Utilizing Mechanical Power**

Su, A, W. 5 2-hr. cl. and lab.

Prereq.: 224.

A study of the selection, installation, operation, and maintenance of mechanical power transmission systems for industrial and transportation activity.

**227 U 4****Electrical Systems and Servicing**

Su, A, W, Sp. 5 2-hr. cl. and lab.

Prereq.: 120.

A study of the fundamental knowledges of techniques necessary for the application of electricity to industrial activities and the practices utilized in fabricating and servicing of electrical systems.

**228 U 4****Electronic Systems and Servicing**

Su, W, Sp. 5 2-hr. cl. and lab.

Prereq.: 227.

A study of the fundamental knowledge of techniques necessary for the application of electronics to industrial activities and the practices utilized in fabricating and servicing electronic systems.

**231 U 4****Construction Practices I**

A, W, Sp. 5 2-hr. cl. and lab.

Prereq.: 120 and 220.

A study of basic concepts of construction technology through experiences in forming, separating, and combining materials used in the production of constructed goods.

**232 U 4****Construction Practices II**

A, Sp. 5 2-hr. cl. and lab.

Prereq.: 231.

A study of construction management, production, and personnel technologies through real and simulated experiences in the production of constructed goods.

**235 U 4****Graphic Reproduction Practices**

Su, A, W, Sp. 5 2-hr. cl. and lab.

Prereq.: 120 and 220.

An examination of graphic reproduction processes, manipulative skills necessary to teach graphic reproduction processes, and administrative procedures required to operate a graphic arts program.

**236 U 4****Printing and Publishing Practices**

A, Sp. 5 2-hr. cl. and lab.

Prereq.: 235.

An examination of the managed production system utilized in the printing and publishing industry.

**243 U 5****Elementary School Industrial Arts Activities**

Su, A, W, Sp. 5 2-hr. cl. and lab.

Prereq.: Major standing in elementary or special ed.

Laboratory experiences involving the use of tools, materials, processes, and products through which society supplies its need for food, clothing, shelter, tools, machines, records, utensils, and transportation.

**251 U 3-6****Work Experience in Industry**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 18 cr. hrs.

A firsthand study of working conditions, methods, and processes of industry, and their implication for the teaching of industrial arts.

**255 U 4****The Handicrafts**

A, W, Sp. 5 2-hr. cl. and lab.

Open only to Occupational Therapy, Physical Education, and Public Recreation majors.

Repeatable to a maximum of 12 cr. hrs.

Designed to develop skills and knowledge in the use of the common areas of handicrafts such as leather, metals, plastics, wood, and the graphic arts.

**289 U 2-5****Field Experience in a Community Agency**

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Professional service with children or youth in some school or community agency.

**294 U 3-5****Group Studies**

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Group studies for students in specialized programs.

**355 U 4****Custom Production of Industrial Goods**

Su, A, W, Sp. 5 2-hr. cl. and lab.

Prereq.: 3rd yr. standing in major.

Not open to students with credit for 255.

A study of custom production planning and custom production processing of industrial goods through experiences in the custom production of selected manufactured goods.

**436 U 3****The Teaching of Driver Education**

Su, A, W, Sp. 1 2-hr. cl., 1 2-hr. lab.

Prereq.: Ed: C & F 435 and valid driver's license.

Not open to students with credit for Ed. 433.

Graduates of the College of Education who complete 436, 437, and 438, or Ed. 433, will be eligible for certification to teach driver training courses in the secondary schools of Ohio.

Designed to prepare teachers to organize and conduct driver training classes in the secondary schools, including methods of teaching, scheduling, and other pertinent details.

**437 U 3****Advanced Course in the Teaching of Driver Education**

Su, A, Sp. 3 cl.

Prereq.: 436.

Organization and administrative aspects of driver and traffic safety education plus orientation in the use of driving simulators and driving ranges. Hoffman.

**438 U 3****Personality and Behavioral Factors in Driver and Traffic Safety Education**

Su, W. 3 cl.

Prereq.: 436; can be taken concur. with 437.

Study of human behavior with emphasis on attitudes, motivation, and adjustment, and their relationship to safe driving.

**532 U 3****The Teaching of Industrial Arts I**

A. 1 2½-hr. cl.

Prereq.: Ed: C & F 435.

A critical study of objectives, methods of presentation, evaluation, class and laboratory procedures, and professional problems.

**533 U 3****The Teaching of Industrial Arts II**

W. 1 2½-hr. cl.

Prereq.: 532.

Examinations and evaluation textbooks, industrial publications, and audio-visual materials suitable for the various grade levels; research and development; and special consideration for exceptional pupils.

**534 U 3****The Teaching of Industrial Arts III**

Sp. 1 2½-hr. cl.

Prereq.: 532 and 533.

Problem design and presentation; planning secondary school courses; methods of student evaluation; and correlation with other subject fields; industrial practice.

**587 U 3-15****Student Teaching in Secondary Schools**

A, W, Sp.

Prereq.: Ed. 4th yr. standing.

A minimum of 15 cr. hrs. is required.

For additional information, see College of Education catalog.

Observation, participation, and responsible teaching in a public school in the Greater Columbus area; individual and group conferences of seminars. Students desiring teaching in more than one area should indicate accurately both section numbers and hours in each.

**594 U 3-5****Group Studies**

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Group studies for students in specialized programs.

**H599 U 3-5****Honors Course**

Su, A, W, Sp.

Prereq.: Enrollment in the Honors Achievement Program and permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

A program of accelerated study for students with special aptitudes.

**610 U G 3****History of Practical Arts and Vocational Education**

Su, W. 3 cl.

History of those vocational and nonvocational phases of agriculture, business, industry, and homemaking which concern education. Lux.

**692 U G 4, 6, or 8****Workshops**

Su. 4 cr. hrs. for 3-wk. workshops.

6 cr. hrs. for 4½-wk. workshops.

8 cr. hrs. for 6-wk. workshops.

Prereq.: Teaching experience, and permission of workshop director.

Repeatable to a maximum of 16 cr. hrs.

Intensive study of a problem common to the participants for the purpose of developing sound principles and practices relating to it.

**693 U G 1-4****Individual Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

A total of not more than 30 cr. hrs. of Individual Study (any 693) will apply toward graduation for undergrad. students, or 45 cr. hrs. for grad. students.

**694 U G 3-5****Group Studies**

W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Group studies on special problems in education.

**H799 U G 3-5****Honors Course**

Su, A, W, Sp.

Prereq.: Enrollment in the Honors Achievement Program and permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

A program of accelerated study and research for students with special aptitudes.

**832 G 3****Industrial Arts in the Elementary School**

Su, Sp. 3 cl.

Prereq.: 243 or equiv.

Selection, development, and evaluation of typical experience units in both classrooms and practical arts laboratory situations at all levels of the elementary schools. Blankenbaker.

**833 G 3****Industrial Arts Curriculum Planning**

Su, A. 1 2½-hr. cl.

Prereq.: Secondary (587) student teaching, or equiv.

Review of resource reports, general and special criterion developments formulation of curriculum guides, and laboratory manuals of instruction. Ray.

**834 G 3****Planning Industrial Arts Facilities**

Su, W. 1 2½-hr. cl.

Principles of industrial arts and technical laboratory planning including equipment selection for all school levels and meeting all curriculum requirements. Ray and Umstattd.

**835† G 3****Organization and Administration of Industrial Education**

1 2½-hr. cl.

Prereq.: 836.

International and historic background curriculum resources and development, physical organization, administrative organization, supervisory operation, and professional policies. Lux.

**836 G 3-5****Practicum in Industrial Arts Education**

A. 3 cl.

Prereq.: Secondary (587) student teaching, or equiv.

Derivation of doctrine, formulation, and evaluation of basic programs, curriculum development, organizational implementation, leadership problems, and professional progress, both here and abroad. Lux.

**837 G 3****Research in Industrial Arts Education**

Su, Sp. 3 cl.

Prereq.: Ed Devel 785 and 786, or permission of instructor.

Identification of research problems and needs. Review of research exemplars with critical analysis of research design and procedures. Buffer and Ray.

**884 G 3-15****Planned Field Experience**

Prereq.: Permission of area adviser.

Planned professional teaching experience in a public school or other educational agency under supervision.

**925 G 2-5****Seminars**

1 2½-hr. cl.

Su, A, W, Sp.

Prereq.: Permission of instructor.

Students with permission of advisers may register for more than one section of 925 or for the same section two or more times.

Research problems in Industrial Arts Education.

**994 G 3-5****Group Studies**

1 2½-hr. cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Advanced group studies on special problems in education.

**999 G Arr.****Research**

Su, A, W, Sp.

Research for thesis or dissertation purposes only.

**Education: Science and Mathematics**

Office: 244 Arps Hall, 1945 North High Street

**Professors** Howe (Chairman), Coon, Crosswhite, and Trimble; **Associate Professors** Helgeson, Mayer, Osborne Roth, Shumway, and White; **Assistant Professors** Blosser, Disinger, Higgins, Steiner, and Thomson.

Mathematics Education: 294.26, 546, 587.26, 594.26, H599, 621, 622, 693.26, 694.26, H799, 841, 842, 843, 844, 845, 884.26, 925.26, 994.26, 999.26.

Science Education: 294.27, 551, 587.27, 594.27, H599, 627, 693.27, 694.27, H799, 849, 850, 851, 884.27, 925.27, 994.27, 999.27.

Abbreviations: Education: Curriculum and Foundatoin = Ed: C & F  
Education: Early and Middle Childhood = E & MC  
Education: Science and Mathematics = Ed: Sc & Ma

**294 U 3-5****Special Group Studies**

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Group studies for students in specialized programs.

294.26 Teaching of Mathematics

294.27 Teaching of Science

**546 U 4****Teaching Mathematics in Secondary Schools I**

A, W. 4 cl.

Prereq.: Ed: C &amp; F 435, and 20 cr. hrs. in Math.

Mathematical concepts, objectives, and classroom procedures appropriate for secondary schools; selection, preparation, and use of teaching materials including lesson plans, study guides, textbooks, and multisensory aids.

**551 U 4****Science in Secondary Schools**

Sp. 4 cl.

Prereq.: Permission of Faculty Chairman or instructor. Objectives, problems and procedures, preparing teaching plans, use of demonstrations, experiments, and projects, science curriculum and evaluation, instruments and procedures, texts and reference materials.

**587 U 3-15****Student Teaching in Secondary Schools**

W, Sp.

Prereq.: Ed. 4th yr. standing.

A minimum of 15 cr. hrs. is required.

For additional information, see College of Education catalog.

Observation, participation, and responsible teaching in a public school in the Greater Columbus area; individual and group conferences or seminars. Students desiring teaching in more than one area should indicate accurately both section numbers and hours in each.

**587.26 Mathematics****587.27 Science****594 U 3-5****Group Studies**

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Group studies for students in specialized programs.

**594.26 Teaching of Mathematics****594.27 Teaching of Science****H599 U 3-5****Honors Course**

Su, A, W, Sp.

Prereq.: Enrollment in the Honors Achievement Program and permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

A program of accelerated study for students with special aptitudes.

**621 U G 4****Teaching Mathematics in Secondary Schools II**

A, W. 4 cl.

Prereq.: 546, and 25 cr. hrs. in Math.

Selected problems in curriculum; evaluation, materials of instruction, and the teaching of specific topics in arithmetic, algebra, and geometry.

**622 U G 3****Laboratory Methods and Materials in School Mathematics**

Su, Sp. 1 2½-hr. cl.

Prereq.: 621 or equiv., and a major or minor in Math.

The laboratory teaching of mathematics; experience in the preparation and use of teaching materials.

**627 U G 3****Practicum in Science for Teachers**

A, W. 3 2-hr. cl.

Prereq.: Permission of Faculty Chairman or instructor. Use and design of apparatus, demonstrations, and experiments for general science, chemistry, biology, and physics, with special emphasis on modern secondary school instructional materials in the sciences.

**693 U G 1-4****Individual Studies**

Su, A, W, Sp.

Prereq.: Ed: C & F 435 or Ed: E & MC 460, and permission of instructor.

A total of not more than 30 cr. hrs. of Individual Study (any 693) will apply toward graduation for undergrad. students, or 45 cr. hrs. for grad. students.

**693.26 Teaching of Mathematics****693.27 Teaching of Science****694 U G 3-5****Group Studies**

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Group studies on special problems in education.

**694.26 Teaching of Mathematics****694.27 Teaching of Science****H799 U G 3-5****Honors Course**

Su, A, W, Sp.

Prereq.: Enrollment in the Honors Achievement Program and permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

A program of accelerated study and research for students with special aptitudes.

**841 G 3****The Use of Certain Concepts of Philosophy and Logic in the Teaching of Mathematics**

Sp. 3 cl.

Prereq.: Permission of instructor.

A study of the role of physical materials and certain concepts of philosophy and logic in the teaching of arithmetic, algebra, and geometry.

**842 G 3****Number Concepts in School Mathematics**

Su, A. 2 1½-hr. cl.

Prereq.: Permission of instructor.

The concept of number systems from the point of view of a teacher who plans to introduce them to students in grades kindergarten through 12.

**843 G 3****Algebraic Concepts in School Mathematics**

Su, Sp. 2 1½-hr. cl.

Prereq.: Permission of instructor.

Such concepts as algebraic structures, order structures, and relation and function as unifying themes for school mathematics.

**844 G 4****Geometric Concepts in School Mathematics**

W, Sp. 4 1-hr. or 2 2-hr. cl.

Prereq.: Permission of instructor.

The historical and contemporary role of geometry in school mathematics; review of research, analysis of current programs and the teaching of selected concepts.

**845 G 4****Curriculum and Supervision in School Mathematics**

Sp.

4 cl. plus observation and participation in selected schools.

Prereq.: Permission of instructor.



The role of state and local supervisors in the design, implementation, and supervision of school mathematics programs (kindergarten through 12) with analysis of contemporary programs and materials of instruction.

#### 849 G 4

##### The Supervision of School Science Programs

4 cl.

Prereq.: Permission of instructor.

For those concerned with supervision of teacher education programs in science; objectives, curricula, recent trends, classroom management, evaluation of teaching, professional literature.

#### 850 G 4

##### Science in the School Curriculum

Su. 2 2-hr. cl.

Prereq.: Permission of instructor.

Foundations for science curriculum, current development, planning and evaluation procedures, research.

#### 851 G 4

##### Science Education in Higher Education

2 2-hr. cl.

Prereq.: Permission of instructor.

Course and curricula for teacher preparation programs in science, clinical experience including student teaching, facilities, evaluation, research, and the role of science education centers.

#### 884 G 3-15

##### Planned Field Experience

Prereq.: Permission of area adviser.

Planned professional teaching experience in a public school or other educational agency under supervision.

884.26 Teaching of Mathematics

884.27 Teaching of Science

#### 899 G 2-4

##### Interdepartmental Seminar in Teaching College Mathematics

Sp. 1 3-hr. cl.

Prereq.: Permission of instructor.

Discussion of problems raised by courses for liberal or general education, service courses, or special education courses commonly offered in college mathematics; given cooperatively by the Department of Mathematics and Education: Science and Humanities. Trimble and Riner.

#### 925 G 2-5

##### Seminars

Su, A, W, Sp.

Prereq.: Permission of instructor.

Students with permission of advisers may register for more than one section of 925 or for the same section two or more times.

Research problems in:

925.26 Teaching of Mathematics

925.27 Teaching of Science

#### 994 G 3-5

##### Group Studies

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Advanced group studies on special problems in education.

994.26 Teaching of Mathematics

994.27 Teaching of Science

#### 999 G Arr.

##### Research

Su, A, W, Sp.

Research for thesis or dissertation purposes only.

999.26 Teaching of Mathematics

999.27 Teaching of Science

## Education: Vocational-Technical

Office: 122 Townshend Hall, 1885 Neil Avenue

**Professors** Reese (Chairman), Hanna, Hillestad, Vivian, and Wells; **Instructors** Densmore, Hephner, Provost, Riley, and Santos.

Business Education: 260, 261, 262, 263, 264, 265, 266, 267, 270, 289, 294.23, 520, 521, 523, 524, 587.23, 594.23, 601, 602, 692.23, 693.23, 694.23, 800, 801, 802, 803, 804, 805, 884.23, 925.23, 994.23, 999.23.

Distributive Education: 289, 294.29, 529, 587.29, 594.29, 601, 605, 606, 608, 692.29, 693.29, 694.29, 884.29, 925.29, 994.29, 999.29.

Trade and Industrial Education: 251, 289, 294.22, 575, 587.22, 594.22, 692.22, 693.22, 694.22, 884.22, 925.22, 994.22, 999.22.

Vocational-Technical Education: 289, 294.30, 594.30, 609, 646, 649, 692.30, 693.30, 694.30, 807, 884.30, 925.30, 994.30, 999.30.

Abbreviations: Education: Curriculum and

Foundations = Ed: C & F

Education: Early and Middle

Childhood = Ed: E & MC

Education: Vocational-Technical = Ed:

Votec

#### 251 U 3-6

##### Work Experience in Private Enterprise

Su, A, W, Sp.

Prereq.: Major standing in chosen area and permission of instructor.

Repeatable to a maximum of 18 cr. hrs.

Occupational competency credit in subject matter field established by comprehensive examination.

#### 260 U 2

##### Typewriting I

A, W. 4 1-hr. lab.

Open only to business education majors and minors, or by permission of the instructor; not open to students with credit for Ed. 206.

Required in the 2nd yr. of students majoring in business education who lack proficiency required for admission to 266.

(Placement tests for students having had previous training in typewriting will be given during the first class meeting of 260, 261, and 262; students reporting for placement tests need not be registered in this course.)

Development of skill in the operation of the typewriter, in producing copy, and in concomitant learning; the place of typewriting in business.

**261 U 2****Typewriting II**

A, W, Sp. 4 1-hr. lab.

Prereq.: 260.

Not open to students with credit for 207.

Continuation of 260.

**262 U 2****Typewriting III**

W, Sp. 4 1-hr. lab.

Prereq.: 261.

Continuation of 261.

**263 U 4****Shorthand I**

A, W. 4 1-hr. lab.

Not open to students with credit for Ed. 208.

Required in the 2nd yr. of students majoring in business education who lack proficiency required for admission to 266.

(Placement tests for students having had previous training in shorthand will be given during first class meeting of 263, 264, and 265; students reporting for placement tests need not be registered in this course.) The theory of Gregg shorthand, development of good shorthand penmanship, the ability to take dictation at increasing rates of speed, and the ability to transcribe longhand using correct punctuation and spelling.

**264 U 4****Shorthand II**

W, Sp. 4 1-hr. lab.

Not open to students with credit for Ed. 209.

Prereq.: 263, or equiv.

Continuation of 263.

**265 U 4****Shorthand III**

Sp. 4 1-hr. lab.

Prereq.: 264.

Continuation of 264.

**266 U 5****Advanced Stenography I**

A. 5 2-hr. lab.

Prereq.: 262 and 265, or equiv.

Not open to students with credit for Ed. 210.

(For placement tests in typewriting and shorthand, see 260 and 263.)

Continued development of speed and accuracy in shorthand and typewriting, development of skill in transcribing; transcribing voice-recorded dictation; duplicating.

**267 U 5****Advanced Stenography II**

W. 5 2-hr. lab.

Prereq.: 266.

Not open to students with credit for Ed. 211.

Continuation of 266.

**270 U 5****Office Procedures**

A. 3 cl., 2 2-hr. lab.

Prereq.: 262 and 3rd yr. standing.

Theory and practice of office fundamentals; duties, responsibilities, procedures, and techniques of office work.

**289 U 2-5****Field Experience in a Community Agency**

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Professional service with children or youth in some school or community agency.

**294 U 3-5****Group Studies**

Prereq.: Permission of instructor.

Group studies for students in specialized programs.

**294.22 Trade and Industrial Education****294.23 Business Education****294.29 Distributive Education****294.30 Vocational-Technical Education****520 U 2****Teaching Typewriting and Office Practice**

W. 2 cl.

Prereq.: 262 or equiv.; Ed: C &amp; F 435, and 4th yr. standing.

Objectives, methods, classroom procedures, and materials for teaching typewriting and clerical practice.

**521 U 2****Teaching Shorthand and Transcription**

W. 2 cl.

Prereq.: 265 or equiv.; Ed: C &amp; F 435, and 4th yr. standing.

Objectives, methods, classroom procedures, materials, and evaluation for teaching shorthand, transcription, and business English.

**523 U 3****Teaching Bookkeeping and Office Machines**

A. 3 cl.

Prereq.: Acc. 221 and senior standing.

The objectives, methods, classroom procedures, and materials for teaching bookkeeping and accounting, office machines, and business arithmetic.

**524 U 3****Methods of Teaching Basic Business Subjects**

W. 3 cl.

Prereq.: Ed: C &amp; F 435, 4th yr. stand and 25 cr. hrs. in Geog., Econ., and Bus. Admin.

Objectives, methods, classroom procedures, and materials for teaching general business, business law, consumer economics, and business organization in the high school.

**529 U 3****Methods of Teaching Distributive Education**

Su, A, W.

Prereq.: Ed: C &amp; F 435.

The organization and preparation of teaching plans for distributive education classes; analysis of current on-the-job training methods in business establishments.

**575 U 3-6**

**Vocational Trade, Industrial, and Technical Teaching**

Su, A, W, Sp.

Prereq.: One year vocational teaching certificate in a skilled or technical occupation, or eligibility for such certificate and permission of instructor.

Repeatable to a maximum of 24 cr. hrs.

Provides teaching methods, techniques, and vocational course organization.

**587 U 3-15**

**Student Teaching in Secondary Schools**

A, W, Sp.

Prereq.: Ed. 4th yr. standing.

A minimum of 15 cr. hrs. is required.

For additional information, see College of Education catalog.

Observation, participation, and responsible teaching in a public school in the Greater Columbus area; individual and group conferences or seminars. Students desiring teaching in more than one area should indicate accurately both section numbers and hours in each.

**587.22 Trade and Industrial Education**

**587.23 Business Education**

**587.29 Distributive Education**

**594 U 3-5**

**Group Studies**

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Group studies for students in specialized programs.

**594.22 Trade and Industrial Education**

**594.23 Business Education**

**594.29 Distributive Education**

**594.30 Vocational-Technical Education**

**601 U G 2**

**Business and Office Education Programs**

Su, A. 2 cl.

Prereq. or concur.: 520, or 521, or 523, or equiv.

Organization, implementation, evaluation, and improvement of vocational office education programs on the secondary school level; required of all business education majors. Hanna.

**602 U G 3**

**Cooperative Office Education**

Su, W. 3 cl.

Prereq.: 520, or 521, or 523, or equiv.

A study of new approaches to organization, operation, and supervision of the Cooperative Office Education Program and the understanding and evaluation of the recent thrust in vocational education and work-study programs.

**605 U G 3**

**Curriculum Content for Distributive Occupational Subjects**

Sp. 3 cl.

Prereq.: 529.

Securing, evaluating, and organizing instructional material and experiences for distributive cooperative education and adult extension courses. Vivian.

**606 U G 3**

**Operation of Distributive Education Programs**

Su, W. 1 2½-hr. cl.

Prereq.: Ed: C & F 435.

A practical study of the development and operation of a distributive education program. Vivian.

**608 U G 2-3**

**Practicum in Distributive Education**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 6 cr. hrs.

Directed employment in a retail, wholesale, or service business previously approved by the student's adviser. Vivian.

**609 U G 3**

**Evolution of Vocational Education**

Su, A, W. 1 2½-hr. cl.

Prereq.: Permission of instructor.

Introduction to the development of vocational education including consideration of influences affecting legislation, federal acts, and basic concepts which have evolved.

**646 U G 3**

**Coordination of Cooperative Vocational-Technical Education Programs**

Su, Sp. 1 2½-hr. cl.

Prereq.: Ed: C & F 435, or equiv.

Designed to develop the knowledges, attitudes, and competencies to operate effectively a cooperative vocational-technical education program. Vivian.

**649 U G 3**

**Vocational-Technical Education for Out-of-School Youth and Adults**

A. 1 2½-hr. cl.

Prereq.: 575 or equiv., and permission of instructor.

Teaching or supervising experience required for graduate credit.

Philosophy, facilities, subject matter, instructional methods, teacher education, supervision, coordination; records and reports, types of programs and relationships. Reese.

**692 U G 4, 6, or 8**

**Workshops**

Su. 4 cr. hrs. for 3-wk. workshops.

6 cr. hrs. for 4½-wk. workshops.

8 cr. hrs. for 6-wk. workshops.

Prereq.: Teaching experience, and permission of workshop director.

Repeatable to a maximum of 16 cr. hrs.

Intensive study of a problem common to the participants for the purpose of developing sound principles and practices relating to it.

**692.22 Trade and Industrial Education**

**692.23 Business Education**

**692.29 Distributive Education**

**692.30 Vocational-Technical Education**

**693 U G 1-4****Individual Studies**

Su, A, W, Sp.

Prereq.: Ed: C &amp; F 435 or Ed: E &amp; MC 460, and permission of instructor.

A total of not more than 30 cr. hrs. in Individual Study (any 693) will apply toward graduation for undergrad. students, or 45 cr. hrs. for grad. students.

- 693.22 Trade and Industrial Education
- 693.23 Business Education
- 693.29 Distributive Education
- 693.30 Vocational-Technical Education

**694 U G 3-5****Group Studies**

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Group studies on special problems in education.

- 694.22 Trade and Industrial Education
- 694.23 Business Education
- 694.29 Distributive Education
- 694.30 Vocational-Technical Education

**800 G 3****Principles in Business Education**

Su, A. 1 2½-hr. cl.

Open only to grad. students majoring in business education, distributive education, or vocational education.

Meaning, purpose, and scope of the business education program; analysis of principles and fundamental issues. Hanna.

**801 G 3****Organization and Teaching of Office Practice**

Su. 3 cl.

Prereq.: 270, or equiv.

The purposes, content, organization, materials, and methods of evaluation for an office practice course; office practice as a part of an intensive vocational curriculum. Wells.

**802 G 3****Administration and Supervision of Business Education**

Su. 1 2½-hr. cl.

Prereq.: Grad. status in business or vocational education.

Administrative problems in business education related to program, facilities, placement and follow-up of graduates, public relations, and federal-state reimbursement.

**803† G 3****Improvement of Instruction in Basic Business Subjects**

3 cl.

Prereq.: 524, or equiv.

A study of objectives, methods, materials, and methods of evaluation for courses such as general business, consumer education, and business law. Wells.

**804 G 2****Improvement of Instruction in Bookkeeping and Data Processing**

Su, Sp.

Prereq.: 523, or equiv.

Evaluation of the content, materials, and methods of teaching bookkeeping, accounting, and data processing on the secondary and postsecondary school levels. Hanna.

**805 G 2**  
**Improvement of Instruction in Secretarial Subjects**

Su. 2 cl.

Prereq.: 520 and 521, or equiv.

Teaching procedures basic to the development of vocational proficiency in typewriting, shorthand, and transcription; available instructional materials, evaluation, standards of achievement. Wells.

**807 G 3**  
**Survey of Vocational Education**

Su, A. 1 2½-hr. cl.

Prereq.: Ed: C &amp; F 435, or equiv.

Open to vocational educators, school administrators, and other graduate students who desire information about vocational education.

A survey of vocational-technical education, vocational guidance, and industrial arts. Vivian.

**884 G 3-15****Planned Field Experience**

Prereq.: Permission of area adviser.

Planned professional teaching experience in a public school or other educational agency under supervision.

- 884.22 Trade and Industrial Education
- 884.23 Business Education
- 884.29 Distributive Education
- 884.30 Vocational-Technical Education

**925 G 2-5****Seminars**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Students with permission of advisers may register for more than one section of 925 or for the same section two or more times.

- 925.22 Trade and Industrial Education
- Su, W.
- Reese.

- 925.23 Business and Office Education
- Su.
- Hanna and Wells.

- 925.29 Distributive Education
- Su, W, Sp.
- Vivian.

- 925.30 Vocational-Technical Education
- A, W, Sp.
- Reese.

**994 G 3-5****Group Studies**

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Advanced group studies on special problems in education.

- 994.22 Trade and Industrial Education
- 994.23 Business Education
- 994.29 Distributive Education
- 994.30 Vocational-Technical Education

999

G Arr.

**Research**

Su, A, W, Sp.

Refer to decimal subdivisions under 925.

Research for thesis or dissertation purposes only.

## Electrical Engineering

Office: 205 Electronics Laboratories, 2015 Neil Avenue

**Professors** Thurston (Chairman), Anderson, Ayres (Emeritus), Bacon, Bailin, Boone, Collins, Cornet, Cowan, D. Davis, W. Davis, Dreese (Emeritus), Gottling, Hsu, Kennaugh, Ko, Kouyoumjian, Kraus, Ksienki, Levis, Long, Mathis, McGhee, McMaster (Regents), Middleton, Peake, Peters, Richmond, Smith, Walter, Warren, Weed, Weimer, and Yovits; **Adjunct Professors** Beer and Warfield; **Associate Professors** Battocletti, Blake, Breeding, Compton, Damon, DeVore, Fenton, Hemami, Higgy (Emeritus), Hodge, Koozekanani, Lackey, Meadors, Ruddock, Sebo, Seliga, and Swartz; **Assistant Professors** Campbell, Ehman, Erdman, Garbacz, Hanson, Huff, Lawrence (Emeritus), Mayhan, Moffatt, Noyes, Olson, Pimmel, Thiele, and White.

201

U 3 or 4

**Circuit Analysis I**

A, W, Sp. 3 or 4 cl.

Prereq.: Math. 153 and Physics 133.

Resistance networks; independent and dependent sources; R, L, C terminal relations; transient response; operational impedance and transfer functions.

202

U 3 or 4

**Circuit Analysis II**

A, W, Sp. 3 or 4 cl.

Prereq.: 201.

Operational methods; sinusoidal and exponential excitation; phasors; power and energy; polyphase circuits; resonance; poles and zeros; mutual coupling.

203

U 3 or 4

**Circuit Analysis III**

A, W, Sp. 3 or 4 cl.

Prereq.: 202.

Coupled circuits and transformers; two-ports; Fourier series; Fourier integral; Laplace transform, impulse response and convolution; applications.

207

U 2

**Circuits Laboratory I**

A, W, Sp. 1 cl., 1 3-hr. lab.

Concur.: 202.

Basic electrical measuring instruments, investigation of various waveforms in R, L, C circuits, transient response, frequency response, polyphase circuits.

208

U 2

**Circuits Laboratory II**

A, W, Sp. 1 cl., 1 3-hr. lab.

Prereq.: 207.

Investigation of properties of the basic circuit elements, periodic non-sinusoidal waveforms, harmonic analysis, nonlinear circuits.

293

U 1-15

**Individual Studies in Electrical Engineering**

S, A, W, Sp.

Repeatable to a maximum of 15 cr. hrs.

294

U 1-15

**Group Studies in Electrical Engineering**

S, A, W, Sp.

Repeatable to a maximum of 15 cr. hrs.

347

U 1

**Electrical Engineering Laboratory**

A, W, Sp. 3-hr. lab.

Concur.: 540.

Laboratory to accompany 540.

400

U 5

**Basic Electronics**

W. 3 cl., 2 2-hr. lab.

Prereq.: Math. 150, Physics 112, and permission of instructor.

Not open to students in Engineering.

Introduction to circuits, devices, and instrumentation with emphasis on practical applications.

417

U 1

**Electromagnetics Laboratory**

A, Sp. 1 3-hr. lab.

Concur.: 512.

Transmission line parameters; attenuation, magnitude and phase of voltage and current on lines; reflected waves; waveguide characteristics and techniques; antenna patterns and impedances.

427

U 1

**Electronic Devices and Circuits Laboratory I**

W, Sp. 1 3-hr. lab.

Prereq. or concur.: 522.

PN junction diode characteristics and circuits; transistor characteristics and the Ebers-Moll model; small-signal parameters of the transistor; transistor bias and amplifier circuits; emitter-coupled difference amplifier.

428

U 1

**Electronic Devices and Circuits Laboratory II**

A, W. 1 3-hr. lab.

Prereq.: 523.

Power amplifiers, performance of linear integrated circuit operational amplifiers; oscillators; voltage regulators, logic circuits; multivibrators; waveform generators.

447

U 1

**Electrical Energy Conversion Laboratory I**

W, Sp. 1 3-hr. lab.

Concur.: 541.

Characteristics of general magnetic networks and transformers; linear and rotary electromechanical devices; transient and steady state; magnetic fields in rotating machines.

**448 U 1****Electrical Energy Conversion Laboratory II**

A, Sp. 1 3-hr. lab.

Prereq.: 447.

Continuation of 447 and inspection of electric power system facilities.

**457 U 1****Signals and Systems Laboratory**

A, W, Sp. 1 3-hr. lab.

Concur.: 550.

Laboratory study of signal processing, control systems and their components, operational amplifiers, and analog computers.

**500 U 4****Electrical Engineering**

Su, A, W, Sp. 3 cl., 3-hr. lab.

Prereq.: Physics 133, and Math. 254.

Introduction to circuit analysis; circuit analysis concepts and their extension to mechanical and thermal systems by analogy; electrical instruments and measurements.

**510 U G 3 or 4****Field Theory I**

A, W. 3 or 4 cl.

Prereq.: Physics 133 and Math. 416.

Vector relations, static electric fields, dielectric materials, boundary conditions, boundary value problems, field mapping, steady electric currents and their magnetic fields, and ferromagnetic materials.

**511 U G 3 or 4****Field Theory II**

W, Sp. 3 or 4 cl.

Prereq.: 510.

Time changing electric and magnetic fields, Maxwell's equations, relations between field and circuit theory, plane waves, Poynting vector, energy relations, and polarization.

**512 U G 3 or 4****Transmission and Radiation**

A, Sp. 3 or 4 cl.

Prereq.: 511.

General transmission theory, infinite line, terminated line, impedance transformation, rectangular waveguides, group and phase velocity, impedance of waveguides, wave propagation, and radiation.

**520 U 4****Electron Devices and Controls**

Su, A, W, Sp. 3 cl., 3-hr. lab.

Prereq.: 500.

Theory and applications of semiconductors, transistors, photoelectric, vacuum and gas filled tubes. Study of control circuits, feedback, amplifiers, oscillators, filters, magnetic amplifiers, and instrumentation.

**521 U G 3 or 4****Electronic Devices and Circuits I**

A, W. 3 or 4 cl.

Prereq.: Math. 415 and concur. Elec. E. 203 and 510.

First of a sequence of four electronics courses including: introduction to electronic circuit devices and models; conduction mechanisms of semiconductors; junction diode models and circuits.

**522 U G 3 or 4****Electronic Devices and Circuits II**

W, Sp. 3 or 4 cl.

Prereq.: 521.

Physical electronics of bipolar and field effect transistors; small-signal models of transistors; transistor bias circuit design; low and high frequency response of single-stage amplifiers.

**523 U G 3 or 4****Electronic Devices and Circuits III**

A, Sp. 3 or 4 cl.

Prereq.: 522.

Multistage amplifier analysis, tuned circuits, and feedback amplifier analysis.

**540 U 3****Electrical Engineering**

A, W, Sp. 3 cl.

Prereq.: 500 or equiv.

Electromechanical devices; an introduction to the basic principles of analysis of electromechanical devices; the approach is organized to extend the circuit concepts and dynamic analysis introduced in the preceding course.

**541 U G 4****Electrical Energy Conversion I**

W, Sp. 3 cl.

Prereq.: 203; prereq. or concur. 510 and 550.

Magnetic circuits, transformers; electromechanical energy conversion principles; basic concepts of rotating machines; engineering considerations of rotating machines; direct current machines, synchronous machines, induction machines.

**542 U G 4****Electrical Energy Conversion II**

A, Sp. 4 cl.

Prereq.: 540 or 541; prereq. or concur.: 512.

Electric power systems; power system elements; power-frequency control, control of voltage and reactive power; load flows; fault analysis; stability; underground energy transmission; HVDC; direct energy conversion.

**550 U G 3 or 4****Introduction to Signals and Systems**

A, W, Sp. 3 or 4 cl.

Prereq.: 203.

Fourier and Laplace transforms, impulse, convolution; feedback systems, block diagrams, signal-flow graphs, stability, frequency response, pole-zero analysis, and application to computers and control.

**570 U G 3****Bio-Medical Engineering Analysis for Non-Engineers**

A. 5 cl.

Prereq.: Math. 123 or 150 or equiv.

Not open to students in College of Engineering. Basic concepts and techniques used in analyzing physical and bio-medical systems. Pimmel.

**571 U G 3****Bio-Medical Engineering Electronics for Non-Engineers**

Sp. 5 cl.

Prereq.: 500 or 570.

Not open to students in College of Engineering.

Fundamentals of solid state electronics; applications to the life science field with emphasis on limitations and laboratory uses. Pimmel.

**572 U G 3****Bio-Medical Engineering Systems for Non-Engineers**

W. 5 cl.

Prereq.: 570 or equiv.

Not open to students in College of Engineering.

Continuation of 570; techniques for modeling and analyzing bio-medical systems, including control systems. Pimmel.

**580 U 1****Professional Aspects of Electrical Engineering**

A. 1 cl.

Employment problems of graduating seniors, professional aspects of engineering and professional societies and ethics; discussion of employment practices.

**601 U G 3****Communication Theory**

A, W. 3 cl.

Prereq.: 523 or 622.

Theory of communication, information content, frequency spectra, noise, methods of modulation, modulators, and demodulators.

**607 U G 2****Electrical Laboratory**

A, W, Sp. 1 cl., 1 3-hr. lab.

Concur.: 601, 623, and 660.

Laboratory in the areas of logic circuits, communication theory, and active circuits.

**610 U G 3****Applied Electromagnetics I**

A, W. 3 cl.

Prereq.: 512.

Rectangular and cylindrical waveguides; waveguide devices; radiation and antenna parameters; array theory. Hodge.

**611 U G 3****Applied Electromagnetics II**

W, Sp. 3 cl.

Prereq.: 610.

Continuation of 610; aperture radiation; geometrical optics; Babinet's principle; antenna impedance; frequency independent antennas. Peters.

**612 U G 3****Applied Electromagnetics III**

Sp. 3 cl.

Prereq.: 611.

Continuation of 611; radio astronomy, brightness temperature, noise, radio telescopes, radio sources, tropospheric propagation, magnetoionic theory, ionospheric propagation, millimeter wave and optical propagation. Levis.

**617 U G 1****Applied Electromagnetics Laboratory**

W. 1 3-hr. lab.

Prereq.: 417; prereq. or concur. 611.

Electromagnetic measurement techniques; microwave sources and detectors; waveguides and waveguide devices; antenna patterns and impedance. Thiele.

**623 U G 3 or 4****Electronic Devices and Circuits IV**

A, W. 3 or 4 cl.

Prereq.: 523.

Continuation of the electronics sequence; physical electronics of solid-state devices, and application to logic and wave generation circuits.

**631 U G 3 or 4****Electron Device Physical Theory I**

W. 3 or 4 cl.

Prereq.: 522 and Physics 580.01; or equiv.

Structure of the solid state; junction diode and transistor theory, and models.

**632 U G 3 or 4****Electron Device Physical Theory II**

Sp. 3 or 4 cl.

Prereq.: 631.

Thermionic emission, photoeffects, transport properties, dielectrics, piezoelectrics, ferroelectrics, theory and applications of magnetic materials.

**660 U G 3****Switching Circuit Theory I**

Su, A, W, Sp. 3 cl.

Prereq.: 520 or 523, or permission of instructor.

Introduction to combinational switching theory, Boolean algebra, and clocked sequential networks.

**670 U G 3****Introduction to Bio-Medical Engineering**

A. 2 cl., 1 3-hr. lab.

Prereq.: 4th yr. Engr. or permission of instructor.

Introduction to the engineering aspects of life science utilizing lecturers from physiology, biophysics, pharmacology, medicine, and psychiatry to introduce subjects discussed in engineering terms. Campbell and Weed.

**693 U G 1-18****Individual Studies in Electrical Engineering**

Su, A, W, Sp.

Repeatable to a maximum of 18 cr. hrs.

**694 U G 1-18****Group Studies in Electrical Engineering**

Su, A, W, Sp.

Repeatable to a maximum of 18 cr. hrs.

**700 U G 3****Advanced Circuits**

W. 3 cl.

Prereq.: 523 or 621.

Introduction to network synthesis. W. Davis.

**702 U G 3****Communications Systems**

W, Sp. 3 cl.

Prereq.: 601.

A study of the synthesis of amplitude and frequency modulated communication systems, with emphasis on transmitters and receivers. W. Davis.

**703 U G 3****Space Communications**

Sp. 3 cl.

Prereq.: 601.

A study of space communication systems; long-distance transmission, wave propagation, and system considerations. D. Davis and Peake.

**704 U G 3****Radar Systems**

A. 3 cl.

Prereq.: 601.

A study of radar systems including applications of modulation and detection theory; includes ranging, tracking, mapping, and guidance and navigation systems. D. Davis.

**707† U G 2****Communications Laboratory I**

W. 1 cl., 1 3-hr. lab.

Prereq.: 523 or 622, 428 or 628, and 601.

Theory and laboratory study of non-linear amplifiers and oscillators, modulators, and detectors. D. Davis.

**708† U G 2****Communications Laboratory II**

Sp. 1 cl., 1 3-hr. lab.

Prereq.: 607.

Laboratory study of communications systems. D. Davis.

**710 U G 3****Microwave Circuits**

A. 3 cl.

Prereq.: 719.

Not open to students with credit for 610.

Advanced waveguides, waveguide devices, amplifiers, generators and detection devices; special microwave techniques. Peake.

**711 U G 3****Radiation from Antennas**

W. 3 cl.

Prereq.: 719.

Not open to students with credit for 611.

Dipole, loop, aperture, reflector, lens, surface wave, and other antennas; array theory; radiation resistance, directivity, and input impedance. Kraus.

**712 U G 3****Microwave Optics**

A. 3 cl.

Prereq.: 719.

Geometrical optics, physical optics, aperture radiation integrals, minimum range requirements, stationary phase, sidelobes, backlobes, aperture blocking, radar echo area, geometrical theory of diffraction, and gyrotropic media. Peters.

**713 U G 3****Elements of Radio Wave Propagation**

Sp. 3 cl.

Prereq.: 719.

Not open to students with credit for 612.

Practical calculations and procedures for predicting refraction and reflection by a plane or spherical earth; tropospheric, ionospheric, and scatter propagation. Levis.

**714 U G 3****Microwave Electronics**

Sp. 3 cl.

Prereq.: 512 and 522.

Vacuum and solid state microwave devices and applications; klystrons, traveling wave tubes, magnetrons, impatt diodes, transferred electron and LSA devices. Cornetet.

**716 U G 3****Electromagnetic Theory of Optical Devices**

Sp. 3 cl.

Prereq.: 203 and 719.

Derivation of geometrical optics from Maxwells equations, diffraction theory, optical spatial filtering, holography, optical resonators, and propagation through a turbulent atmosphere. Collins.

**719 U G 3****Electromagnetic Field Theory I**

Su, A, W. 3 cl.

Prereq.: 512 or equiv.

Fundamental laws of electrodynamics; dielectric, magnetic, and conductive media; energy, force, and momentum; radiation, scattering, and dispersion; interior boundary value problems. Ko.

**720 U G 3****Circuit Theory of Solid State Devices**

W.

Prereq.: 523.

Advanced circuit theory of solid-state devices. Boone and Thurston.

**721 U G 3****Advanced Electronic Circuits**

Sp.

Prereq.: 623.

Integrating and differentiating circuits; counting circuits; timing circuits; pulse circuits; wave-forming and wave-shaping circuits. W. Davis.

**722 U G 3****Active Network and Logic Circuit Design by Digital Computer**

A, Sp. 3 cl.

Prereq. or concur.: 623 or permission of instructor.



Study of computer aided network design programs, topological matrices; active device modeling, linear and nonlinear solutions; logic circuit analysis and design by digital computer. Battocletti.

**727 U G 2**

**Solid State Device Laboratory**

W. 1 cl., 1 3-hr. lab.

Prereq.: 428; prereq. or concur. 720.

Laboratory study of solid-state devices. Battocletti.

**728 U G 2**

**Advanced Electronic Circuits Laboratory**

Sp.

Prereq.: 428; prereq. or concur. 721.

Laboratory study of integrating and differentiating circuits; counting circuits; timing circuits; pulse circuits; wave-forming and wave-shaping circuits. Cornet.

**732 U G 4**

**Quantum Electron Devices**

Sp. 4 cl.

Prereq.: Math. 415 and 416; or equiv.

Electronic energy levels in quantum electron devices; application to energy transitions in crystalline and gaseous media; applications to semiconductors, masers, and lasers. Hsu.

**733 U G 3**

**Parametric Electronics and Nonlinear Optics**

W. 3 cl.

Prereq.: 512; Math. 415 and 416; or equiv.

Coupled mode theory of lumped circuit and traveling wave parametric interaction, Hamiltonian treatment of nonlinear interactions, nonlinear optics, simulated Raman and Brillouin scatterings, and phonon-phonon interactions. Hsu.

**734 U G 3**

**Solid State Electronics Design and Technology I**

W. 3 cl.

Prereq. or concur.: 522 or permission of instructor.

Discrete and planar electronic device design and associated silicon and germanium technology; semiconductor crystal growth; liquid-solid transformations; epitaxy, oxidation, diffusion, p-n junctions, planar diodes, and transistors. Middleton.

**735 U G 3**

**Solid State Electronics Design and Technology II**

Sp. 3 cl.

Prereq.: 734.

Si junction and surface FET, MOS devices; integrated active and passive device design; integrated circuit design and fabrication; photolithography; wafer processing and control testing; assembly; packaging. Middleton.

**737 U G 3**

**Solid State Electronics Design and Technology Laboratory**

A, W, Sp. 2 3-hr. lab.

Prereq.: 521 or permission of instructor.

Repeatable to a maximum of 9 cr. hrs.

Fundamental experiments in solid state semiconductor and energy conversion electronics; conductivity, Hall coefficient; magneto-resistance; drift mobility; diffusion; lifetime; p-n junctions; crystal growth; thermoelectric and optical properties. Middleton.

**740 U G 3**

**Electric Power Systems I**

A. 3 cl.

Prereq.: 542.

A study of steady state operation of electric power systems; network concepts, power network representations; network solutions with matrix methods; asymmetrical systems; control of voltages, watts and vars; load-flows; economic dispatch. Sebo and Smith.

**741 U G 3**

**Electric Power Systems II**

W. 3 cl.

Prereq.: 542.

The methods and devices used in systems protection; protection systems, relay types, pilot wire and carrier systems, relay response; protection of machines, transformers, buses, and lines; instrument transformers; modern trends in protection. Sebo and Smith.

**742 U G 3**

**Electric Power Systems III**

Sp. 3 cl.

Prereq.: 542.

A study of transient operation of electric power systems: circuit breakers, circuit interruption, switching transients, traveling waves, insulation coordination, and stability. Sebo.

**743 U G 3**

**Advanced Theory of Electrical Machines**

Sp. 3 cl.

Prereq.: 542.

Matrix representation, steady-state and transient analysis of transformers; d-c, induction, synchronous, and special machines. Mathis.

**747 U G 2**

**High Voltage Laboratory I**

A. 1 cl., 1 3-hr. lab.

Prereq.: 542.

A laboratory study of high-voltage insulation. Sebo and Smith.

**748 U G 2**

**Power System Laboratory**

Sp. 1 cl., 1 3-hr. lab.

Prereq.: 740 or 741.

A laboratory study of power system engineering problems. Sebo and Smith.

**749 U G 2**

**High Voltage Laboratory II**

W. 1 cl., 1 3-hr. lab.

Prereq.: 747

Laboratory study of high voltage impulse testing techniques. Smith.

**750 U G 3**

**Linear System Theory**

Su, A, W. 3 cl.

Prereq.: 550.

Not open to students with credit for 800.

Writing system equations for electrical, mechanical, and mixed systems with lumped parameters; solution by means of transform methods and numerical methods. McGhee.

**751 U G 3****Open Cycle Control and Instrumentation**

W. 3 cl.

Prereq.: 541 or 641, and concur. 550 or 650; or 520 and 540 with permission of instructor.

Engineering analysis and design applied to selected practical problems in the fields of sensors, measurement, signal handling, and systems as parts of overall control problems. Weed.

**752 U G 3****Feedback Control Systems I**

A. 3 cl.

Prereq.: 550.

Application of feedback principles to control systems, system equations; performance criteria; compensation, carrier systems, multivariable systems. Weimer.

**753† U G 3****Magnetic Amplifiers**

Sp. 3 cl.

Prereq.: 542 or 642, and 550 or 650; or 520 and 540, with permission of instructor.

Theory and transient analysis of self-saturating magnetic amplifiers, system control and regulation, and memory methods. Weed.

**754 U G 3****Feedback Control Systems II**

Sp. 3 cl.

Prereq.: 550.

Analysis of nonlinear control systems; computer simulation, numerical methods, phase-plane techniques, describing functions, and switched systems. Fenton.

**755 U G 3****Digital Control Systems**

W. 3 cl.

Prereq.: 550.

Difference equations, z-transforms, digital filtering, sampling quantization, analog-digital conversion; block diagramming to model digital and hybrid control systems. Fenton.

**757 U G 2****Control Systems Laboratory I**

W. 1 cl., 1 3-hr. lab.

Concur.: 751 or 752.

Experiments chosen by student interest from the course content of open cycle and instrumentation and feedback control systems. Bacon.

**758 U G 2****Control Systems Laboratory II**

Sp. 1 cl., 1 3-hr. lab.

Concur.: 753, 754, or 755.

May be taken without 757.

Experiments chosen by student interest from the course content of magnetic amplifiers, feedback control systems, and digital control systems.

**760 U G 3****Theory and Design of Digital Computers**

A, W, Sp. 3 cl.

Prereq.: 660.

Number systems, introduction to computer programming, design of arithmetic and control units for general purpose digital computers, and interrelation of hardware and software system design. Breeding.

**761 U G 3****Switching Circuit Theory II**

W, Sp. 3 cl.

Prereq.: 660.

State minimization, asynchronous sequential machines, the state assignment problem, transient analysis of combinational switching networks, linear sequential networks, and threshold logic. McGhee.

**762 U G 3****Information Theory**

W. 3 cl.

Prereq.: 660 or 550 or permission of instructor.

Introduction to information theory; codes, sources, and transmission over noisy channels. D. Davis and Lackey.

**763 U G 3****Hybrid Computation**

A. 3 cl.

Prereq.: 550 and Compu. and Info. Sc. 241 or equiv.

Introduction to combined analog-digital techniques; hybrid system components; error analysis; hardware and software. Lackey.

**764 U G 3****Digital Signal Processing**

Sp. 3 cl.

Prereq.: 550.

Transmission of information, conversion to digital form, and conventional analysis methods; processing techniques including complex exponentials and Walsh/Haar Transform theory; generalized Fourier Transform. Lackey.

**767 U G 2****Digital Computer Laboratory**

A, W, Sp. 1 cl., 1 3-hr. lab.

Concur.: 760.

Laboratory study of counting, arithmetic, and digital circuits. Olson.

**770 U G 3****Biological Control Systems**

W. 2 cl., 1 3-hr. lab.

Prereq.: 550 or equiv.; 670 and permission of instructor or Physiol. 600.

Application of electrical engineering to the analysis of biological control systems such as visual, muscular, thermal, and cardiovascular; receptor, nerve axon, and muscle transfer characteristics. Campbell.

**771 U G 3****Bio-Medical Instrumentation**

Sp. 2 cl., 1 3-hr. lab.

Prereq.: 520 or 522; 670 and permission of instructor or Physiol. 600.

Application of electrical engineering to instrumentation, monitoring, and signal and data handling in bio-electrical measurements; consideration of implants, heart pacers, electrocardiograms and electroencephalographs, and speech analysis. Campbell.

**772 U G 3**

**Advanced Bio-Medical Instrumentation**

A. 2 cl., 1 3-hr. lb.

Prereq.: 520 or 522; 670 and permission of instructor or Physiol. 600.

Classroom and laboratory investigation of some of the advanced instrumentation problems in EEG, EKG, catheter measurements, spectral analysis, correlation, cell potential, and ion evaluation. Campbell.

**793 U G 1-18**

**Individual Studies in Electrical Engineering**

Su, A, W, Sp.

Repeatable to a maximum of 18 cr. hrs.

**794 U G 1-18**

**Group Studies in Electrical Engineering**

Su, A, W, Sp.

Repeatable to a maximum of 18 cr. hrs.

**801† G 3**

**State Variable Methods in Linear Systems**

A, W. 3 cl.

Prereq.: 550.

Elements of linear transformation and matrix theory; state equations and vectors; differential time-invariant and time-variable systems; discrete systems; observability and stability. Hemami.

**802 G 3**

**Network Synthesis I**

Sp. 3 cl.

Prereq.: 750 and Math. 552.

Modern theory of network synthesis with applications to advanced design of filters, equalizers, and compensators. W. Davis and Warren.

**803 G 3**

**Network Synthesis II**

A. 3 cl.

Prereq.: 802.

Continuation of 802. W. Davis and Warren.

**804 G 3**

**Communication Theory I**

A, W. 3 cl.

Prereq.: 504, 550, or permission of instructor.

The application of Fourier series and Fourier integral methods of the design and analysis of communication circuits and signals. W. Davis and Warren.

**805 G 3**

**Communication Theory II**

W, Sp. 3 cl.

Prereq.: 804 and Statist. 520.

The application of statistical methods to problems in communication systems including signal representation, modulation, detection, and filtering. W. Davis and Warren.

**806 G 3 or 4**

**Communication Theory III**

Sp. 3 or 4 cl.

Prereq.: 805.

Topics selected from the communication applications of statistical decision-theory, signal representation, optimal filtering, and other matters of current interest. Warren.

**808† G 3**

**Theory and Analysis of Magnetic Amplifiers**

W. 3 cl.

Prereq.: 523 or 622, and 800; or equiv.

Theory of magnetic materials; steady state and transient analysis of magnetic amplifiers; suppressed and free harmonics; power gain; resistive, inductive, and capacitive load. Weed.

**810 G 3**

**Electromagnetic Field Theory II**

W. 3 cl.

Prereq.: 719.

Solution of Maxwell's equations in time and frequency domains; field theorems; integral representations; eigenfunction solutions; fields of moving charges. Kouyoumjian.

**811 G 3**

**Waveguides and Resonators**

W. 3 cl.

Prereq.: 810, and 610 or 710.

General theory of waveguides, modes, discontinuities, losses, cavities, and power considerations. Peake.

**814 G 3**

**Advanced Antenna Theory I**

Su. 3 cl.

Prereq.: 810, and 611 or 711.

Field theorems; boundary-value problems; solution of the integral equations for scattering problems; radiation integrals; far-field criteria; antenna theorems; mathematical and numerical techniques. Richmond.

**815 G 3**

**Advanced Antenna Theory II**

Sp. 3 cl.

Prereq.: 810, and 611 or 711.

Analysis and synthesis of linear and planar radiating systems; excitation and propagation of surface and leaky waves; modulated traveling-wave structures; backward-wave antennas. Walter.

**816 G 3**

**Propagation of Electromagnetic Waves**

A. 3 cl.

Prereq.: 810, and 612 or 713.

Advanced study of transmission and reception of radio waves in the presence of the earth and its atmosphere; tropospheric, ionospheric, and scatter propagation. Levis.

**817 G 3**

**Advanced Electromagnetic Theory I**

A. 3 cl.

Prereq.: 810 or equiv.

Representation of fields by vector wave functions and dyadic Green's functions; Huygen's principle for electromagnetic waves; application to antenna and scattering problems. Kouyoumjian.

**818 G 3****Advanced Electromagnetic Theory II**

W. 3 cl.

Prereq.: 817, or 712 and 810.

Asymptotic methods and the geometrical theory of diffraction; integral equations and variational methods; propagation through inhomogeneous media and anisotropic media; surface waves. Kouyoumjian.

**819 G 3****Advanced Electromagnetic Theory III**

Sp. 3 cl.

Prereq.: 818, or 712 and 810.

Application of saddle-point methods to electromagnetic problems; Fock theory for currents on curved surfaces; application of variational and perturbation techniques to electromagnetic problems. Kouyoumjian.

**820† G 3****Methods of Analysis of Interaction Between Electrons and Fields**

A. 3 cl.

Prereq.: 631 and 810 or permission of instructor.

Electron beams; energy transfer; induced current; space charge waves; traveling and backward wave interactions; coupled-mode analysis; crossedfield interactions. Cornet.

**821† G 3****Theory of Electron Guns and Electron Beams**

W. 3 cl.

Prereq.: 522 and 810.

Electron optical principles; effect of thermal velocities; effect of space charge; electron guns; periodic focusing. Cornet.

**829 G 3****Plasma Dynamics**

Sp. 3 cl.

Prereq.: 810.

Motion of ions and electrons, ionization processes, electromagnetic phenomena in plasma, electron beams in plasma. Ko and Peters.

**830 G 3****Solid State Electron Devices I**

A. 3 cl.

Prereq.: 631, 732, or equiv.

Physical properties of solids, crystal symmetry, lattice vibrations, electrons in a periodic lattice; the effective mass theorem. Swartz.

**831 G 3****Solid State Electron Devices II**

W. 3 cl.

Prereq.: 830.

Irreversible thermodynamics and the Onsager relation; the Boltzman transport equation, lattice and impurity scattering, conductivity and related phenomena; optical properties of semiconductors. Swartz.

**832 G 3****Solid State Electron Devices III**

Sp. 3 cl.

Prereq.: 831.

Semiconductors and metals in strong electric and magnetic fields; theory of negative resistance devices, microwave devices, and related topics. Swartz.

**833 G 3****Theory of Semiconductor Junction Devices I**

A. 3 cl.

Prereq.: 522.

Low and high level injection in p-n junctions; recombination statistics; the bipolar transistor, static and switching characteristics, low and high frequency equivalent circuits, and thermal effects. Boone and Swartz.

**834† G 3****Quantum Electron Devices**

A. 3 cl.

Prereq.: 732 and 810.

Analysis of energy of atomic gases as applied to gas lasers; crystal structure of solid-state maser and laser materials.

**837 G 3****Dielectric and Magnetic Electronics**

W. 3 cl.

Prereq.: 522 and 631, or equiv.

Application of dielectric and magnetic effects to electron devices; dipoles; local fields; electromechanical interactions; spontaneous polarization, domain structure, and switching. Gottling.

**838 G 3****Semi-Insulator Electronics**

Sp. 3 cl.

Prereq.: 522 and 631, or equiv.

Conduction effects in low conductivity materials applied in electron devices; space-charge limited currents; tunneling devices; Schottky barrier effects; thin film electronics. Gottling.

**839 G 3****Theory of Semiconductor Junction Devices II**

W. 3 cl.

Prereq.: 833.

Continuation of 833; theory of the unipolar transistor, the MOS capacitor and transistor. Boone and Swartz.

**840 G 3****Electromechanical Systems**

A. 3 cl.

Prereq. or concur.: 750.

Application of the methods of electric circuit analysis to mechanical, acoustical, electromechanical, and electroacoustical systems. Cowan.

**841 G 3****Computer Methods in Power System Analysis**

W. 3 cl.

Prereq.: 740; prereq. or concur. Compu. and Info. Sc. 541.

Network matrices, algorithms for formation of network matrices, three-phase network matrices; short circuit studies; iterative solutions of algebraic and differential equations; load flow and transient stability studies of large systems. Sebo and Smith.

#### 842 G 3

##### **Economic Operation and Control of Electric Power Systems**

A. 3 cl.

Concur.: 740.

Principles of economic operation and control of isolated or interconnected electric power systems, including effects of power losses in transmission lines. Smith.

#### 843 G 3

##### **Advanced Power System Analysis**

Sp. 3 cl.

Prereq.: 841 or 842.

High voltage direct current systems; converter operation, control; harmonics, filters, reactive power requirements; reliability applications in power systems; Markov processes, combinatorial reliability; power system reliability evaluation. Sebo.

#### 850 G 3

##### **Theory and Design of Feedback Control Systems**

W. 3 cl.

Prereq.: 750 and 752.

Linear feedback theory, signal-flow graphs, return difference, stability studies with parameter variation, independent control of transmission and sensitivity functions, multi-variable systems, and approximation methods. Weimer.

#### 851 G 3

##### **Synthesis of Linear Feedback Control Systems**

Sp. 3 cl.

Prereq.: 755 and 850.

Sampled-data systems, the Z-transform, digital compensation; synthesis of systems with statistical inputs and constraints; advanced topics. Weimer.

#### 853 G 3

##### **Analysis of Non-Linear Systems**

A. 3 cl.

Prereq.: 754, and 702 or 851 or Statist. 520 or permission of instructor.

An advanced study of non-linear systems and methods of analysis; stability studies with Liapunov functions and functional analysis; applications from electric circuits and control systems. Fenton.

#### 854 G 3

##### **Optimal Control Theory I**

W. 3 cl.

Prereq.: 752, and 750 or 801.

Optimal control by dynamic programming, Pontryagin's maximum principle, and variational methods; minimum time, energy, and fuel problems for linear continuous and discrete systems. Hemami.

#### 855 G 3

##### **Optimal Control Theory II**

Sp. 3 cl.

Prereq.: 854.

Computational methods in optimal control,

quasi-linearization, and invariant imbedding; estimation and filtering for continuous and discrete linear systems; introduction to stochastic system optimization. Hemami.

#### 863 G 3

##### **Coding Theory**

W. 3 cl.

Prereq.: 660 or permission of instructor.

The coding problem; linear codes and their implementation; cyclic codes. Lackey.

#### 864 G 3

##### **Coding Theory and Digital Systems**

W, Sp. 3 cl.

Prereq.: 760.

Coding theory; digital system hardware and software design alternatives; monitors, time sharing, and batch processing systems; hardware-software interaction in loading, assembly, and compiling. Breeding.

#### 865 G 3

##### **Advanced Sequential Logic**

A, Sp. 3 cl.

Prereq.: 761 or permission of instructor.

State identification and fault detection; finite automata, memory definiteness, and information losslessness; linear sequential machines; finite state recognizers. McGhee.

#### **Radio Astronomy Theory I**

(See under Astron. 862.)

#### **Radio Astronomy Theory II**

(See under Astron. 863.)

#### 870 G 3

##### **Biological System Modeling I**

A. 2 cl., 1 3-hr. lab.

Prereq.: 550, Physiol. 600 or 601.

Consideration of current literature in the area of biological system modeling; cardio-vascular, water regulation, and visual tracking and light control; laboratory implementation of models. Weed.

#### 871 G 3

##### **Biological System Modeling II**

W. 2 cl., 1 3-hr. lab.

Prereq.: 550, Physiol. 600 or 601.

Modeling of such biological systems as thermoregulatory, respiratory, skeletal-muscle, and neurological. Digital and analog computer laboratory implementation.

#### 872 G 3

##### **Bio-Medical Systems Modeling and Cybernetics**

Sp. 3 cl.

Prereq.: 870 or 871.

An engineering analysis of modern methods of mathematical and computer modeling of living control systems; analog, digital, and hybrid computer methods. Weed.

#### 880 G 1-18

##### **Advanced Studies in Electrical Engineering**

Su, A, W, Sp. 1-3 cl.

Repeatable to a maximum of 18 cr. hrs.

881 G 1-3

**Seminar in Electrical Engineering**

Su, A, W, Sp. 1-3 cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 18 cr. hrs.

895 G 1-5

**Interdepartmental Seminar in Radio Astronomy**

A, W, Sp.

(See under Interdepartmental Seminars.)

899 G 1-5

**Interdepartmental Seminar**

A, W, Sp.

(See under Interdepartmental Seminars.)

910 G 3

**Advanced Antenna Theory III**

W. 3 cl.

Prereq.: 810, 804, and 611 or 711.

Time modulated antennas, synthetic aperture antennas, logical switching antennas, nonlinear processing antennas, and correlation arrays; the effects of signal-processing on beamwidth, gain, and multiple-target response. Ko and Walter.

993 G 1-18

**Individual Studies in Electrical Engineering**

Su, A, W, Sp. Individual Conf.

Repeatable to a maximum of 18 cr. hrs.

999 G Arr.

**Research in Electrical Engineering**

Su, A, W, Sp.

Research for thesis or dissertation purposes only.

## Engineering

134 U 5

**Environmental Science and Technology**

W. 5 cl.

Prereq.: Chem. 101 or equiv.

Principles and application of sciences and technology in the abatement of pollution of soil, air, water, and biomass from agricultural, municipal, industrial, and nuclear wastes. Carey, Sykes, Sweeney, and Taiganides.

150 U 5

**Nature of the Digital Computer**

Sp. 5 cl.

Not open to students in the College of Engineering.

An overview of the history, logical design, and organization of the digital computer; development of basic logical components and the overall organization of these machines. Pimmel.

210 U 5

**Technology and Society I**

A, Sp. 5 cl.

Prereq.: One year of high school algebra.

Not open to students in the College of Engineering.

Basic concepts and modes of thinking of our technological age; emphasis on the decision process and modeling. Pimmel.

211 U 5

**Technology and Society II**

W. 5 cl.

Prereq.: 210.

Not open to students in the College of Engineering.

Continuation of 210 with emphasis on dynamic systems including the concepts of feedback and stability. Pimmel.

220 U 3

**Understanding Systems**

Sp. 3 cl.

Prereq.: Permission of instructor.

Discussions of historical, philosophic, and sociologic antecedents to the development of a science of systems; students draw upon their individual experiences with real systems to formulate a science of systems. Smith.

## Engineering Graphics

Office: 240 Hitchcock Hall, 2070 Neil Avenue

**Professors** Parkinson (Acting Chairman), Hang, Kearns, LaRue, Paffenbarger (Emeritus), Reed, Romeo, Shupe, Watkins, and Yarrington; **Associate Professor** Smith; **Assistant Professors** Baldwin and Kennedy.

110 U 5

**General Engineering Graphics**

A, W, Sp. 5 2-hr. cl. and lab.

Prereq. or concur.: Math. 150.

Not open to students with credit for 112.

Graphic language of engineering and its application to the analysis, development, representation, and communication of engineering concepts. Watkins.

121 U 3

**Graphic Presentation I**

A, W, Sp. 3 2-hr. cl. and lab.

Representation of three-dimensional subjects by precise graphics; orthographic and pictorial. Parkinson.

122 U 3

**Graphic Presentation II**

A, W, Sp. 3 2-hr. cl. and lab.

Prereq.: 121.

Continuation of 121; elements of descriptive geometry, intersections and development of surfaces, shade and shadow, size description; selected design problems. Reed.

123 U 3

**Graphical Methods**

A, W, Sp. 3 2-hr. cl. and lab.

Prereq.: 122.

Graphical aids for representing and interpreting technical data, and solving management problems; includes logic diagrams, network diagrams, and flow, scheduling, and break-even charts. Romeo.

H190 U 4

**General Engineering Graphics**

A, W. 4 2-hr. cl. and lab.

Prereq.: Honors admission to College of Engineering. Graphic language of engineering and its application to the analysis, development, representation, and communication of engineering concepts; intensified coverage of selected topics.

194 U 1-5

**Special Problems in Engineering Graphics**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

Selected problems of an experimental nature stressing the systematic approach to engineering graphics problems and embracing appropriate modes of attack.

200 U 3

**Computer Utilization with Introduction to Engineering Analysis**

Su, A, W, Sp. 3 cl. and lab. hr.

Prereq. or concur.: Math. 152.

Application of the digital computer to engineering analysis. Use of algebraic programming languages; Computer Center facilities and procedures. Kennedy.

202 U 4

**Space Geometry**

W, Sp. 4 2-hr. cl. and lab.

Prereq.: 122.

Not open to students with credit in 102.

Theory and application of descriptive geometry in the solution of technical problems; includes axonometric projection, perspective, topographic drawing, shade, and shadow. Romeo.

204 U 4

**Technical Drawing**

A. 4 2-hr. cl. and lab.

Prereq.: 102, 122, or permission of instructor.

Commercial drawing practice; size specification, tolerance, and fits; technical sketching and layout of machine parts and assemblies; drawing symbols and schematic diagrams; drafting room procedures. Watkins.

206 U 4

**Graphical Representation of Sheltering Structures**

W. 4 2-hr. cl. and lab.

Prereq.: 102, 122, or permission of instructor.

Preparation of drawings of wood-framed and steel-framed residential and light commercial buildings; terminology; permit and code requirements.

208 U 4

**Production Illustration**

Sp. 4 2-hr. cl. and lab.

Prereq.: 102, 122, or permission of instructor.

Pictorial representation in commercial and industrial usage; technical illustration techniques; templates and commercial aids digital plotter drafting procedures. Baldwin.

237 U 5

**Engineering Graphics for Interior Designers**

Sp. 5 2-hr. cl. and lab.

Representation of three-dimensional subjects by precise graphics; orthographic and pictorial; shade and shadows; applications to interior design. Parkinson.

400 U 3

**Advanced Engineering Computation**

Sp. 3 1-hr. cl.

Prereq.: 200 or Compu. and Info. Sc. 241 and Math. 152.

An advanced course in numerical and computational methods with emphasis on the application of the digital computer to the solution of engineering problems. Kearns.

410 U 3

**Computer Graphics**

Sp. 3 1-hr. cl.

Prereq.: 200 or Compu. and Info. Sc. 241.

An advanced course in graphics with emphasis on the application of computer-generated graphics to the solution of engineering problems. LaRue.

593 U G 1-5

**Individual Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

Opportunity to pursue special-interest topics not otherwise offered.

## Engineering Mechanics

Office: 209 Boyd Laboratory, 155 West Woodruff Avenue

**Professors** Graff (Chairman), Folk (Emeritus), Graham, Leissa, Ott (Emeritus), Popelar, Powell (Emeritus), Stevens, and West; **Associate Professors** Clausen, Fu, and Wu; **Assistant Professors** Engin, Tuschak, and Wells.

204 U 3

**Applied Mechanics**

A. 3 cl.

Prereq.: Math. 152.

Not open to students with credit for 201.

Statics of force systems by analytical and graphical means; introduction to response of deformable bodies to axial, bending, and torsional loads; area-moment methods.

**205 U 3****Applied Mechanics**

W. 3 cl.

Prereq.: 204.

Not open to students with credit for 202.

Continuation of 204.

**206 U 3****Applied Mechanics**

Sp. 3 cl.

Prereq.: 205.

Not open to students with credit for 202.

Continuation of 205.

**210 U 4****Statics**

Su, A, W, Sp. 3 cl., 2 1-hr. lab.

Prereq.: Physics 131; prereq. or concur. Math. 254.

Resultant and equilibrium of coplanar and noncoplanar force systems; trusses, frames, and connected bodies; friction; centroids and moment of inertia of masses and areas.

**215 U 5****Statics and Strength of Materials**

A, W, Sp. 5 cl.

Prereq.: Physics 131; prereq. or concur. Math. 254.

Resultant and equilibrium of isolated and connected body force systems; introduction to response of deformable bodies to action of axial, and bending and torsional loads.

**410 U 4****Dynamics**

A, W, Sp. 4 cl.

Prereq.: 210 or 215.

Not open to students with credit for 415 or 510.

Linear and angular motion from constant and variable forces; connected bodies; impulses; momentum; energy.

**415 U 4****Dynamics**

Su, A, Sp. 4 cl.

H415 (honors) may be available to students enrolled in a college honors program.

Prereq.: 210 or 215; Math. 255 or 415.

Not open to students with credit for 510.

Dynamics of particles and rigid bodies; impulses, momentum, work, and energy; three dimensional vector acceleration; conservative systems; single degree of freedom vibration analysis.

**420 U 4****Strength of Materials**

Su, A, W, Sp. 4 cl.

H420 (honors) may be available to students enrolled in a college honors program.

Prereq.: 210.

Normal and shearing stress and strain; energy; torsion; flexural stress; beam deflections; combined stress, theories of failure; columns.

**427 U 1****Strength of Materials Laboratory**

A, Sp. 1 2-hr. lab.

Prereq. or concur.: 420.

Experimental study of response of deformable bodies to loads using mechanical and electrical gages and methods of photoelasticity.

**594 U G 2-5****Group Studies in Engineering Mechanics**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

**622 U G 4****Advanced Strength of Materials**

A, Sp. 4 cl.

Prereq.: 420 and Math. 255.

Not open to students with credit for 521 or 522.

Mohr's Circle for strain; failure theories; curved beams; bending of non-symmetrical sections; non-circular torsion; beams on elastic foundations; load-deflection relations by energy methods.

**627 U G 3****Experimental Methods in Mechanics**

A, Sp. 2 cl., 2 lab. hrs.

Prereq.: 420.

Static and dynamic strain analysis by electrical gages; grid techniques; brittle coatings; analogies; reflective photoelasticity in normal and oblique incidence; motion measurements.

**660 U G 5****Fluid Dynamics**

A. 5 cl.

Prereq.: 410 and Math. 514.

Basic equations and concepts of fluid flow; two and three dimensional inviscid flow problems; conformal transformations; vortex motion; viscous flow; boundary layer effects; compressible flow.

**711 U G 3****Advanced Engineering Dynamics**

W. 3 cl.

Prereq.: 410 and Math. 255 or 556.

Three-dimensional vector statics, kinematics and kinetics of particles and rigid bodies; energy, momentum, and stability; application of Lagrange's equations to machinery, vehicles, and ballistics; gyroscope.

**731 U G 3****Vibrations of Discrete Systems**

A. 3 cl.

Prereq.: 410 and Math. 255 or 556.

Free and forced vibrations of mechanical systems having lumped mass and elasticity; normal coordinates; dissipative system; stability; simple engineering applications.

**732 U G 3****Non-Linear Vibrations**

Sp. 3 cl.

Prereq.: 731 and Math. 552 or equiv.

Vibrations of damped and undamped systems with non-linear restoring forces; self-sustained oscillations; application of Hill's equation of stability of non-linear oscillations.



**740 U G 3****Applied Elasticity I**

A. 3 cl.

Prereq.: 622 and Math. 512, or equiv.

Classical problems in elasticity; St-Venant torsion and bending theory; plane problems in rectangular and polar coordinates; axisymmetric problems; thermoelasticity.

**741 U G 3****Applied Elasticity II**

W. 3 cl.

A continuation of 740.

**748 U G 3****Photoelasticity**

W. 2 cl., 2 lab. hrs.

Prereq. or concur.: 741.

Stress analysis using polarized light techniques; polariscope optics; photoelastic materials and models; two and three dimensional problems; dynamics photoelasticity, photoplasticity, and thermal studies.

**751 U G 3****Theory of Elastic Stability**

A. 3 cl.

Prereq.: 622, and Math. 255 or 556; or equiv.

Buckling of struts, rings, arches, and plates; torsional instability; stability criteria, exact and approximate methods.

**752 U G 3****Theory of Dynamic Stability**

Sp. 3 cl.

Prereq.: 731.

Study of the criteria for dynamic stability; methods of stabilizing critical mechanical systems; applications to space mechanics, structures, and vehicles.

**754 U G 3****Theory of Thin Elastic Plates**

W. 3 cl.

Prereq.: 622 and Math. 512, or equiv.

Derivation of the basic equations; classical solutions for rectangular and polar coordinates; approximate methods.

**793 U G 2-5****Individual Studies in Engineering Mechanics**

Su, A, W, Sp.

Prereq.: 711, 731, 741, and permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

See 794 for topics.

**794 U G 2-5****Group Studies in Engineering Mechanics**

Su, A, W, Sp.

Prereq.: 711, 731, 741, and permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

The student must register for specific problems in the areas indicated below, and may register for more than one at a time.

- Experimental Stress Analysis.
- Dynamics.
- Fluid Mechanics.

- Applied Elasticity.
- Strength of Materials.
- Vibrations.
- Plasticity.
- Plates and Shells.
- Continuous Media.
- Review of Advanced Foreign Literature in Mechanics.
- Biomechanics.

**800† G 3****Methods of Engineering Analysis**

A. 3 cl.

Prereq.: 10 cr. hrs. of 700-level courses in Engr. Mech.; Math. 512 or equiv.

Not open to students with credit for 700.

Solution of boundary value, eigenvalue, and initial value problems arising in mechanics by approximate methods; weighted residual and stationary functional methods.

**811†\* G 3****Analytical Dynamics**

Sp. 3 cl.

Prereq.: 711.

Lagrange's equations of motion for particles and rigid bodies; impulse; small oscillations, non-dissipative and dissipative systems; Hamiltonian systems; applications to intricate engineering problems.

**812 G 3****Energy Principles in Mechanics**

A. 3 cl.

Prereq.: 622 and Math. 255, or equiv.

Theoretical development of energy principles in mechanics; strain energy and complementary energy with related minimal principles; applications to problems in elasticity, dynamics, and vibrations.

**831 G 3****Vibrations of Continuous Systems**

W. 3 cl.

Prereq.: 731; prereq. or concur. Math. 512 or 557.

Equations of motion for strings, membranes, prismatical bars, and plates for various boundary conditions; approximate methods for complicated shapes; wave propagation in elastic media.

**832 G 3****Vibrations Laboratory**

Sp. 2 2-hr. lab.

Prereq.: 831.

Experiments in vibrations of discrete systems, beams, plates, and shells; propagation of stress waves; material properties by dynamic measurements.

**833 G 3****Elastic Wave Propagation**

Sp. 3 cl.

Prereq.: 740 and 831.

Dispersion and group velocity; waves in extended media; propagation and reflection in half space; Lamb problem; waves in plates and rods by exact theory; scattering of waves.

**835†\* G 3****Random Vibrations**

A. 3 cl.

Prereq.: 831.

Description of random processes; statistical properties of the response of mechanical systems; optimization of systems subjected to random inputs; instrumentation.

**840 G 3****Theory of Continuous Media**

A. 3 cl.

Prereq.: 740.

Equilibrium, compatibility, and strain displacement relationships for a general continuum; constitutive equations for problems of elasticity, fluid dynamics, and inelasticity.

**843† G 3****Advanced Elasticity**

A. 3 cl.

Prereq.: 741.

Complex variable methods; anisotropic elasticity; three-dimensional elasticity; mixed boundary value problems; thermoelasticity.

**847 G 3****Theory of Plasticity**

Sp. 3 cl.

Prereq.: 740 and Math. 512.

Plastic range stress-strain relations; elasto-plastic behavior of beams, and trusses; torsion of prismatic bars; plane strain; shear lines; limit analysis.

**854† G 3****Plates and Shallow Shells**

Sp. 3 cl.

Prereq.: 754.

Advanced methods for the analysis of bending in thin, elastic plates having arbitrary shapes, loading, and boundary conditions; bending theory of shallow shells, and problem solutions.

**855 G 3****Theory of Thin Elastic Shells**

W. 3 cl.

Prereq.: 754.

Differential geometry of surface; general equations for an arbitrary shell; membrane theory; shells of revolution.

**860†\* G 3****Classical Hydrodynamics**

Sp. 3 cl.

Prereq.: 711; Math. 512, 513, and 514, or equiv.

Basic equations and concepts of inviscid fluid flow, solutions to two- and three-dimensional problems; conformal transformations; approximate methods.

**864 G 3****Theory of Viscoelasticity**

W. 3 cl.

Prereq.: 740.

Basic concepts of time dependent inelastic behavior; viscoelastic constitutive laws; correspondence principles; quasi-static and dynamic problems.

**889 G 1****Seminar in Engineering Mechanics**

W, Sp. 1 cl.

Repeatable to a maximum of 6 cr. hrs.

Lectures and discussions covering a wide range of topics, presented by staff, graduate students, and guest speakers.

**993 G 2-5****Individual Studies in Engineering Mechanics**

Su, A, W, Sp.

Prereq.: Evidence of sufficient background in area of study chosen, and permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

See 994 for topics.

**994 G 2-5****Group Studies in Engineering Mechanics**

Su, A, W, Sp.

Prereq.: Evidence of sufficient background in area of study chosen and permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

The student must register for specific subject in the areas indicated below and may register for more than one at a time.

- a. Advanced Experimental Methods.
- b. Advanced Dynamics.
- c. Hydrodynamics and Fluid Mechanics.
- d. Applied Elasticity.
- e. Strength of Materials.
- f. Vibrations.
- g. Plasticity.
- h. Plates and Shells.
- i. Continuous Media.

**999 G Arr.****Research in Engineering Mechanics**

Su, A, W, Sp.

Research for thesis or dissertation purposes only.

## English

Office: 421 Denney Hall, 164 West 17th Avenue

**Professors** Gabel (Chairman), Muste (Vice Chairman), Altick (Regents), Beja, Canzoneri, Corbett, Dathorne, Derby (Emeritus), Estrich (Emeritus), Fullington (Emeritus), Hughey (Emeritus), Kahrl, Kincaid, Kuhn, Logan (Emeritus), Markels, Marshall, Maurer, Percival (Emeritus), Robbins, Soellner, Utley, Walley (Emeritus), Wheeler, and Wilson (Emeritus); **Associate Professors** Battersby, Blickle, Brown, Cox, Ferguson, Good, Grigsby, Hascall, Jones, Lockridge, Martin, Mullen, Scheps, Sena, Shapiro, Snow (Emeritus), Varadyan, and Woodson; **Assistant Professors** Adams, W. Andrews, Auburn, Baillie, Barnes, Cooley, Craig (Emeritus), Dasher, Dees, Dorsey (Emeritus), Dumble (Emeritus), England, Frantz, Fullmer, Kabealo (Emeritus), Kane (Emeritus), Libby, Longenecker, Mitchell, Munday, O'Sullivan, Passe, Rudensky, Swetnam, Vroonland, Weatherford, J. Williams, and Zacher; **Instructors** D. Andrews, Augspurger, Brosch, Canary, Carpenter, Carter, Connor (Emeritus), Davis, Diskin, Edwards (Emeritus), E. Falor, R. Falor, Haber (Emeritus), Hoch, Jerman, Moots, Nyenhuis, Overmyer, Rupright, Schorr, Tucker, Vogel (Emeritus), and D. Williams.

## ENGLISH FOR FOREIGN STUDENTS

Course credit may not be counted toward graduation.

**071 U 5****General English for Foreign Students**

Su, A, W, Sp.

Review of English structure for foreign students; proceeds from basic oral-aural patterns to their application in writing. Hoch, Director.

**072 U 5****Advanced English for Foreign Students**

Su, A, W, Sp.

Develops academic and social effectiveness in the use of advanced patterns in written and spoken English. Hoch, Director.

**073 U 3****Special Problems in English for Foreign Students**

Su, A, W, Sp.

Attention given to special academic problems of foreign students; concentrated work on idiomatic structure and diction in writing reports, themes, examinations, and theses. Hoch, Director.

## ENGLISH COMPOSITION

No prerequisite except when testing determines 071, 072, or 073 to be required.

**100 U 5****Freshman English Composition**

Su, A, W, Sp.

Not open to students with credit for 102, 103, 104, 105, H195, or 301.

Training in the fundamentals of expository writing, as illustrated in the student's own writing and in the essays of professional writers. Good, Director.

**160 U 3****Introduction to Literature**

Su, A, W, Sp.

Open only to freshmen.

An introduction to selected works of major British and American writers, designed to stimulate and train the reader's appreciation of literature.

**193 U 3-5****Individual Studies**

Su, A, W, Sp.

Prereq.: Freshman standing and permission of Director of Freshman English.

Repeatable to a maximum of 10 cr. hrs.

**194 U 3-5****Group Studies**

A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

Designed to give groups of students an opportunity to pursue studies not otherwise offered in English.

GENERAL PREREQUISITES FOR COURSES  
NUMBERED 200

Unless otherwise indicated, the prerequisites for 200-level courses are English 100, 103, 105, or H195.

**220 U 5****Introduction to Shakespeare**

Su, A, W, Sp.

Students working toward the B.A. in English should elect 520 instead of 220.

Intensive study of selected plays of Shakespeare designed to give an understanding of drama as theatrical art and as an interpretation of fundamental human experience.

**260 U 5****Introduction to Poetry**

Su, A, W, Sp.

Designed to help students understand and appreciate poetry through intensive study of a representative group of poems.

**261 U 5****Introduction to Fiction**

Su, A, W, Sp.

Intensive study of a number of short stories and novels to acquaint the general student with some of the important themes and techniques of fiction.

**262 U 5****Introduction to Drama**

Su, A, W, Sp.

A critical analysis of selected dramatic masterpieces from Greek antiquity to the present, designed to clarify the nature and major achievements of western dramatic art.

**265 U 5****The Writing of Fiction I**

Su, A, W, Sp.

Prereq.: Permission of director.

Practice in the writing of fiction; analysis and discussion of student work, with some attention to general methods of fiction and the publishing situation. Canzoneri, Director.

**266 U 5****The Writing of Poetry I**

A, W, Sp.

Prereq.: Permission of director.

Practice in the writing of poetry; emphasis on the students' own work, with reference to established poetic patterns and established poetry. Canzoneri, Director.

**270 U 5****Introduction to Folklore**

A, W, Sp.

A general study of the field of folklore including basic approaches and a survey of primary folk materials; folktales, legends, folksongs, ballads, and folk beliefs.

**280 U 5****The English Bible**

Su, A, W, Sp.

A study of the Bible, in English translation, with respect to literary questions, historical development, and religious concepts.

**281 U 5****Introduction to Afro-American Literature**

Su, A, W, Sp.

(Offered in cooperation with the Black Studies Division.)

A survey (1760 to present) of significant major and minor literary works written by blacks about the black experience in American life.

**283 U 5****Masterpieces of English Literature**

A, Sp.

Not open to students with credit for 293.

Introduction to medieval and renaissance narrative poetry, beginning with Beowulf and including major works of Chaucer, Spenser, and Milton.

**284 U 5****Masterpieces of English Literature**

Su, W, Sp.

Not open to students with credit for 294.

The neo-classical and romantic periods; major works by such authors as Pope, Swift, Dryden, Johnson, Wordsworth, Coleridge, and Keats.

**285 U 5****Masterpieces of English Literature**

Su, A, W, Sp.

Not open to students with credit for 240 or 295.

The Victorian and early modern periods with major works by such authors as Tennyson, Browning, Arnold, Shaw, Conrad, Lawrence, Joyce, and Yeats.

**290 U 5****Masterpieces of American Literature**

Su, A, W, Sp.

Not open to students with credit for 551, 552, 553.

A critical study of some major American writers chosen from among the following: Poe, Hawthorne, Emerson, Thoreau, Melville, Whitman, Dickinson, Twain, James, Frost, Eliot, Faulkner, and Hemingway.

**H296 U 5****Sophomore Honors Seminar**

A, W.

Prereq.: Cumulative point-hour ratio of 3.0 or better, with 3.5 or better in Engl., and permission of dept.

Studies in the relationship of works of literature to their general intellectual contexts, involving such topics as Deism, Marxism, Primitivism, Freudian psychology; topic varies quarterly. Jones, Director.

**H299 U 5****English Honors Pro-seminar**

Sp.

Prereq.: Cumulative point-hour ratio of 3.0 or better, with 3.5 or better in Engl. and permission of dept.

An introduction to the materials and methods of literary study through intensive reading in one major English or American author; topic varies quarterly. Jones, Director.

**301 U 5****Informative Writing**

Su, A, W, Sp.

Prereq.: 3rd yr. standing and 100 or equiv.

Not open to students with credit for 302.

Intensive advanced training in the art of informative writing.

**302 U 5****Critical Writing**

Su, A, W, Sp.

Prereq.: 100 or equiv., Engl. majors only.

Not open to students with credit for 301.

Intensive practice in writing various kinds of analyses of literary texts.

**305 U 3****Technical Writing**

Su, A, W, Sp. 2 cl., 1 hr. conf.

Prereq.: 3rd yr. standing in the B.S. curricula.

Training in practical writing for industry, business, and research, with emphasis on the special requirements and techniques for the professional report. Blickle, Director.

**GENERAL PREREQUISITES FOR COURSES  
NUMBERED 500**

These courses may provide graduate credit only in departments other than English. Prerequisites: 15 hrs. of courses in English on the 200 level, or 10 hrs. in English and 10 in specified allied departments.

**513 U G 5****Introduction to Medieval Literature**

Sp.

The study of masterpieces from the Middle Ages, chosen for their values in interpreting medieval culture as well as for their independent literary worth.

**520 U G 5****Shakespeare**

Su, A, W, Sp.

A critical consideration of the art, personality, and achievement of Shakespeare in the light of Renaissance and modern significance.

**521 U G 5****The English Renaissance**

Sp.

Not open to students with credit for 621.

A study of Tudor prose and poetry as they exemplify literary art and as they reflect the creative and inquiring temper of the age.

**522 U G 5****Early 17th Century Literature**

Sp.

A study of the poetry and prose of 1600-1660, excluding the major works of Milton.

**530 U G 5****Milton**

W.

A study of the major poetry and prose, with emphasis on *Paradise Lost*, *Paradise Regained*, and *Samson Agonistes*.

**531 U G 5****The Age of Wit and Satire**

A.

The skeptical mind of the Early Enlightenment as shown in lyric and satiric verse, essays, and drama, from Dryden to Pope.

**535 U G 5****Literature of the 18th Century**

W.

The ideas and artistry of the Age of Reason as reflected in the work of major figures: Swift, Pope, Fielding, Sterne, Boswell, Johnson, and Blake.

**540 U G 5****Romantic Poetry**

A, W, Sp.

English literary and intellectual romanticism as seen in the poetry of Wordsworth, Coleridge, Byron, Shelley, and Keats, and selected critical documents of the period.

**541 U G 5****Victorian Poetry**

Su, W.

Readings in the poetry of Tennyson, Browning, Arnold, Swinburne, Rossetti, Meredith, Hopkins, and Hardy, as seen against the background of Victorian ideas and literary taste.

**542 U G 5****The 19th Century English Novel**

A, Sp.

Not open to students with credit for 641.

Readings in a group of major novelists, such as Austen, Dickens, Thackeray, and others, with special emphasis upon social and humanistic values.

**543 U G 5****20th Century British Fiction**

Su, A, W, Sp.

Not open to students with credit for 643.

A study of the development of British fiction after 1900, with emphasis on such major novelists as Conrad, Joyce, Lawrence, and Woolf.

**547 U G 5****20th Century Poetry**

A, W, Sp.

A study of 20th century American and British poetry, with emphasis on such major figures as Frost, Yeats, Stevens, Eliot, Williams, and Auden.

**551 U G 5****The American Renaissance in Literature**

Su, A, W, Sp.

The readings of this course do not duplicate those of 290.

An introduction to the major American writers of the mid-19th century: Poe, Hawthorne, Melville, Emerson, Thoreau, and Whitman.

**552 U G 5****American Literature, 1865-1914**

A, W, Sp.

Studies in fiction and poetry emphasizing such major figures as Twain, Howells, James, Dickinson, Robinson, Crane, Dreiser, and Willa Cather.

**553 U G 5****20th Century American Fiction**

Su, A, W, Sp.

A study of American fiction after 1914, with emphasis on the work of such major figures as Anderson, Fitzgerald, Hemingway, and Faulkner.

**570 U G 5****English Style and Usage**

A, W, Sp.

Variety in style and use in written and spoken English.

**580† U G 5****Afro-American Language**

W.

A lexical, phonological, and grammatical examination of Afro-American language as used in black literature, the blues, street-corner dialogues, and in other social and cultural situations.

**581 U G 5****Afro-American Folklore**

A, Sp.

A study of the oral traditions of black American culture including folktales and other narrative lore, folksongs, blues, spirituals, and work songs.

**H590 U 5****Junior Honors Seminar**

A, W, Sp.

Prereq.: Cumulative point-hour ratio of 3.0 or better, with a 3.5 or better in Engl. and permission of dept.

Intensive study of one of the major periods of English and American literature; periods vary quarterly.

**H590.01 The Middle Ages****H590.02 The Renaissance****H590.03 Neo-Classicism****H590.04 Romanticism****H590.05 The Later 19th Century****H590.06 The Modern Period****594 U G 5****Group Studies**

A, W, Sp.

Repeatable to a maximum of 30 cr. hrs.

Topic varies from quarter to quarter on subjects not otherwise covered by English courses.

**GENERAL PREREQUISITES FOR COURSES  
NUMBERED 600**

These courses may provide graduate credit in all departments. Prerequisites: 15 hrs. of courses in English on the 500 level, or 10 hrs. in English and 10 hrs. on the 300-500 level in specified allied departments.

**615 U G 5****Introduction to Chaucer**

A.

A close study of *Troilus and Criseyde* and *The Canterbury Tales* as introduction to the artist and his period.

**624 U G 5****English Drama: Medieval and Renaissance**

W.

Prereq.: 220, 262, or equiv.

A study of English popular drama from its origin to 1642, with special emphasis upon the evolution of dramatic concepts and theatrical art.

**634 U G 5**

**English Drama: Restoration and 18th Century**

Sp.

Prereq.: 220, 262, or equiv.

A study of English drama from 1660 to 1800: Restoration heroic drama and wit comedy, 18th century sentimental drama, the comedy of Goldsmith and Sheridan.

**642 U G 5**

**19th Century Prose**

A.

Selections from the principal romantic and Victorian non-fictional prose writers, read both as literary art and as documents of contemporary thought.

**648 U G 5**

**Contemporary Literature**

Su, W.

A study of the development of contemporary American and British fiction and poetry, concentrating upon representative works of major authors from 1945 to the present.

**649 U G 5**

**Modern Drama**

Sp.

An historical and critical examination of the major developments, personalities, and achievements in the drama of Europe and America since the advent of Ibsen.

**665 U G 5**

**The Writing of Fiction II**

A, W, Sp.

Prereq.: 265 or equiv. and permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

Practice in the writing of fiction; continuation of 265 at an advanced level.

**666 U G 5**

**The Writing of Poetry II**

W.

Prereq.: 266 or equiv. and permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

Practice in the writing of poetry; continuation of 266 at an advanced level.

**667† U G 5**

**Playwriting**

W.

Prereq.: Permission of instructor.

Practice in the writing of plays; analysis and discussion of student work, with some attention to general dramatic methods.

**669 U G 5**

**Applied English Phonology**

W.

A study of English phonology and its application to a variety of literary and non-literary resources.

**670 U G 5**

**American Folklore**

Sp.

A study of the major forms of American folklore with emphasis on folktales, legends, folksongs, and ballads.

**671 U G 5**

**Introduction to English Grammar**

Su, A.

A study of various systems of English grammar, with emphasis on their application to writing and teaching.

**672 U G 5**

**Introduction to the History of English**

Sp.

A study of the historical development of the English language, with emphasis on its outer history, and on the history of words and sentences.

**676† U G 5**

**History of Literary Criticism**

W.

Intensive study of the basic texts in literary criticism from Plato to T. S. Eliot.

**680† U G 5**

**Literary and Cultural Heritage of the Middle East**

W.

An introduction to Assyro-Babylonian, Arabic, and Persian literature in their historical and cultural settings.

**693 U G 1-5**

**Individual Studies in English**

Su, A, W, Sp.

Prereq.: Senior standing and permission of instructor and of Dept. Undergrad. or Grad. Committee.

Repeatable to a maximum of 10 cr. hrs.

Students may register for individual directed study under this number for work not normally offered in courses.

**H695 U 5**

**Senior Honors Seminar**

W.

Prereq.: Cumulative point-hour ratio of 3.0 or better, with a 3.5 or better in Engl. and permission of dept.

Selected problems (themes, movements, genres, and styles) emphasizing continuity and development in English and American literary and linguistics history; topic varies quarterly.

**699 U 5**

**Senior Seminar and Tutorial**

A, W, Sp.

Prereq.: Engl. majors in their last qtr.

A reading course designed to unify the student's knowledge of English and American literature and to clarify his understanding of problems of interpretation and criticism.

**H783 U G 3-5**

**Honors Essay**

Su, A, W, Sp.

Prereq.: 4th yr. standing; the record of A in at least half his Engl. courses and an average of B in all of his courses; the permission of professor under whose supervision the work is to be completed.

Open only to candidates for distinction in Engl. who have in their junior year completed with high grades a program approved by the Committee on Honors. Repeatable to a maximum of 10 cr. hrs.

A program of reading arranged for each student, with individual conferences, reports, and honors thesis. Jones, Director.

#### GENERAL PREREQUISITES FOR COURSES NUMBERED 800

Prerequisites: 30 hrs. of courses in English or 20 hrs. in English and 25 hrs. in specified allied disciplines.

#### 800 G 2

##### Introduction to Graduate Study

A.

Open only to M.A. candidates.

Required of all M.A. candidates.

An introduction to the methods and tools of graduate study in English and American literature.

#### 810 G 5

##### Introduction to Old English Language and Literature

A.

The reading of Old English prose with special attention to the language and to cultural background.

#### 812 G 5

##### Beowulf

W.

Prereq.: 810 or equiv.

A close study of the text of Beowulf and its background.

#### 813 G 5

##### Middle English

Sp.

Prereq.: 810 or permission of instructor.

A study concentrating on 12th to 14th century English language and literature.

#### 814 G 5

##### Studies in Early English Literature

A.

Prereq.: Either 615, 810, 813, or equiv.

A detailed and critical study of a medieval author or topic, exclusive of Chaucer.

#### 815 G 5

##### Studies in Chaucer

Sp.

A critical study of some aspect of Chaucer's work in depth.

#### 816 G 5

##### The Middle Ages

W.

A lecture-survey of Late Middle English literature concentrating on the period 1300-1500.

#### 820 G 5

##### Shakespeare

A.

An intensive consideration of selected problems in the scholarly study of Shakespeare.

#### 821 G 5

##### Studies in Renaissance Prose

W.

The evolution of literary prose from More to Milton as seen in representative works which are related critically to rhetorical theory and significant cultural forces.

#### 822 G 5

##### Studies in Renaissance and Early 17th Century Poetry

A.

A close study of significant verse of late 16th and early 17th centuries.

#### 823 G 5

##### Spenser

W.

A study of Spenser's poetry, its literary significance and its relation to foreign, classical, and native English poetic traditions.

#### 824 G 5

##### Studies in Renaissance Drama

Su, Sp.

A critical study of significant trends in English drama between 1500 and 1642, excluding Shakespeare.

#### 826 G 5

##### The Renaissance

Sp.

A lecture-survey of literature of the English Renaissance, 1500-1660.

#### 830 G 5

##### Milton

Sp.

A critical study of the poetry and prose of John Milton, viewed against his social and literary background.

#### 831 G 5

##### The Age of Dryden

Su.

A detailed study of Dryden and his contemporaries.

#### 832 G 5

##### The Age of Pope and Swift

Sp.

A detailed study of Pope, Swift, and their contemporaries.

#### 833 G 5

##### The Age of Johnson

A.

A detailed study of Johnson, Boswell, and their contemporaries.

#### 834† G 5

##### Studies in the 18th Century English Novel

Su.

Intensive study of a selected critical or historical problem in English prose fiction from 1660 to 1800.

**836† G 5****The Restoration and 18th Century**

W.

A lecture-survey of English literature between 1660-1798.

**840 G 5****Studies in Romantic Poetry and Poetics**

W.

Literary romanticism, as represented by one or more of the poets (Blake, Coleridge, Wordsworth, Byron, Shelley, and Keats), in relation to contemporary intellectual and political movements; topic varies year to year.

**841 G 5****Studies in Victorian Poetry**

Sp.

The artistic values of the poetry, its place in the romantic tradition, its reflection of the contemporary intellectual and social milieu; topic varies each year.

**842† G 5****Studies in 19th Century Prose**

A.

Selected non-fictional prose, read as examples of literary art and as documents of the age's religious, political, social, and aesthetic thought; topic varies from year to year.

**843 G 5****Studies in the 19th Century English Novel**

Su, W.

Intensive study of some aspect of the novel in the period from Jane Austen to Thomas Hardy; topic varies from year to year.

**846 G 5****The 19th Century**

A.

A lecture-survey of 19th century English literature, 1798-1900.

**847 G 5****20th Century Poetry**

Su, W.

Prereq.: Acquaintance with the major poets studied in 547 is assumed.

An intensive study of a representative body of modern poetry, with emphasis on several major poets of England and America.

**848 G 5****Studies in 20th Century British Fiction**

A, Sp.

Prereq.: Acquaintance with modern continental novelists is recommended.

Tendencies in modern British fiction as seen in the works of such major figures as Conrad, Forster, Joyce, Virginia Woolf, and D. H. Lawrence.

**849† G 5****Studies in Major 20th Century Writers**

W.

An intensive study of the works of one or two major poets, novelists, or dramatists, such as Conrad, Shaw, O'Neill, Eliot, Stevens, Joyce, Faulkner, or Hemingway.

**851 G 5****Studies in the American Renaissance**

A, Sp.

Prereq.: 551 or equiv.

An intensive study of several authors drawn from the following list: Cooper, Poe, Hawthorne, Melville, Emerson, Thoreau, and Whitman.

**852 G 5****Studies in American Literature, 1865-1914**

Su, W.

Prereq.: 552 or equiv.

An intensive study of several major authors of the period, including Twain and James.

**853 G 5****Studies in Individual American Writers, 1800-1900**

Sp.

An intensive study of the works of a single major American author of the 19th century; author varies yearly.

**855 G 5****Studies in 20th Century American Fiction**

Sp.

An examination of the development of 20th century American fiction as seen in the works of several central novelists such as Faulkner, Fitzgerald, and Hemingway.

**856† G 5****American Literature**

Sp.

A lecture-survey of American literature between 1820 and 1900.

**870 G 5****Studies in Folklore**

W.

Intensive study of some particular aspect of folklore.

**871† G 3****Principles and Methods of Linguistic Analysis**

Su.

Prereq.: Permission of director.

The study of the principal methods of the analysis of the English language.

**872 G 3****Structural Analysis of English Expository Prose**

A.

Prereq.: Permission of director.

**873 G 3****Principles and Methods of Literary Analysis**

W.

Prereq.: Permission of director.

Principles and methods of the study of English poetry, drama, and prose fiction.

**876 G 5****Studies in Critical Theory**

Sp.

A review of theory and practice in some of the principal forms of literary analysis.



**877 G 5****Advanced English Grammar**

W.

Prereq.: Grad. standing and one of the following: 669, 671, 672, Ling. 600, 601, Speech 852, or equiv.

An advanced approach to the grammar and the grammars of English and to their application to teaching and writing.

**878 G 5****History of the English Language**

Sp.

Prereq.: Grad. standing, and one of the following: 669, 671, 672, Ling. 600, 601, Speech 852, or equiv.

An advanced approach to the history of English, with emphasis on inner history as well as its outer matrix, and its place among the world's languages.

**880 G 5****Studies in English or American Literature**

Su, A, W.

Prereq.: Permission of Dept. Grad. Committee Chairman.

Offered occasionally as an intensive course on some phase of English or American literature.

**Medieval and Renaissance Culture**

(See Medieval and Renaissance Studies 888.)

**Medieval and Renaissance Literature**

(See Medieval and Renaissance Studies 889.)

**GENERAL PREREQUISITES FOR COURSES  
NUMBERED 900**

Prerequisites: 15 hrs. of English on the 800 level.

**910†\* G 5****Studies in the Medieval Period**

W, Sp.

Individual research in a major aspect of Old and Middle English literature.

**911†\* G 5****Studies in the Medieval Period**

Su.

Prereq.: 910.

Continuation of 910.

**912†\* G 5****Research in Chaucer**

W.

Individual research in various aspects of medieval literature, with Chaucer as center.

**913†\* G 5****Research in Chaucer**

Sp.

Prereq.: 912.

A continuation of 912.

**920†\* G 5****The English Renaissance**

W.

Reading and research in non-dramatic literature of the English Renaissance; topics may vary from year to year.

**921†\* G 5****The English Renaissance**

Sp.

Prereq.: 920.

A continuation of 920.

**922\* G 5****Studies in the Age of Shakespeare**

W.

Exploration of the problems, materials, and methods relevant to a scholarly study of Shakespeare's work and cultural environment, culminating in individual research.

**923\* G 5****Studies in the Age of Shakespeare**

Sp.

Prereq.: 922.

Continuation of 922.

**933†\* G 5****Research in the Restoration Period**

A.

Individual research in Restoration literature, Dryden to Pope; oral and written reports.

**934†\* G 5****Research in the Restoration Period**

W.

Prereq.: 933.

Continuation of 933.

**935\* G 5****Studies in 18th Century Literature**

A.

Problems in the literature and ideas of the Age of Reason.

**936\* G 5****Studies in 18th Century Literature**

W.

Prereq.: 935.

Continuation of 935.

**940†\* G 5****Studies in 19th Century Literature**

A.

Reading and research in the literary production of the century and its intellectual and social backgrounds; topic varies from year to year.

**941†\* G 5****Studies in 19th Century Literature**

W.

Prereq.: 940.

Continuation of 940.

**947 G 5****Studies in 20th Century Literature  
and Cultural History I**

Sp.

Individual research in British and American literature of the 20th century.

**948 G 5**  
**Studies in 20th Century Literature**  
**and Cultural History II**  
 Su.  
 A continuation of 947.

**950†\* G 5**  
**Studies in American Literature**  
**and Cultural History Before 1900—I**  
 W.  
 Individual research in problems in American literature  
 before 1900.

**951†\* G 5**  
**Studies in American Literature**  
**and Cultural History Before 1900—II**  
 Sp.  
 Prereq.: 950.  
 Continuation of 950.

**980 G 5**  
**Bibliography and Method**  
 W.  
 For advanced graduate student in the methods and  
 tools of literary research.

**982†\* G 5**  
**Textual Criticism and Editing**  
 W.  
 Prereq.: 980.  
 Evaluation of literary editorial methods, past and  
 present; training in skills requisite to the textual  
 critic and scholarly editor; practice in textual editing.

**993 G 1-15**  
**Individual Studies**  
 Su, A, W, Sp.  
 Prereq.: Permission of Dept. Grad. Committee.  
 Repeatable to a maximum of 30 cr. hrs.  
 Doctoral students may register for individual study in  
 areas not normally covered by courses.

**998 G Arr.**  
**Research in English: Thesis**  
 Su, A, W, Sp.  
 Preparation for the master's comprehensive  
 examination, and research for the thesis.

**999 G Arr.**  
**Research in English: Dissertation**  
 Su, A, W, Sp.  
 Research for dissertation purposes only.

## Entomology

Office: 103 Botany and Zoology Building, 1735 Neil  
 Avenue

**Professors** Goleman (Chairman), Blair, Borror, Briggs,  
 Britt, Fisk, Holdsworth, Johnston, Niemczyk, Rings,  
 Rothenbuhler, Shambaugh, Slesman, Stairs, Treece,  
 Triplehorn, and Wharton; **Associate Professors** Barry,  
 Collins, Goonewardene, Hink, Horn, King, Knoke,  
 Krueger, Ladd, Miller, Musick, Nault, and Waldron;  
**Assistant Professors** Connor, Foster, Hall, Lindquist,  
 Lyon, Neilsen, and Williams.

### 200

#### General Entomology

The biology of insects; form, function, classification,  
 behavior, and ecological relations, including effect on  
 man. Johnston, Stairs, and Triplehorn.

##### 200.01 General Entomology: Lecture U 3

A, W, Sp. 3 cl.

Prereq.: Biol. 100, or Zool. 201, or equiv.

Not open to students with credit for 200.

##### 200.02 General Entomology Laboratory U 2

A, W, Sp. 2 2-hr. labs.

Prereq. or concur.: 200.01.

Not open to students with credit for 200.

### 361 U 5

#### Apiculture

Sp. 3 cl., 2 2-hr. labs.

The principles of management of honeybees in the  
 production of honey, wax, package-bees, and queens  
 and in pollinating crops of economic importance.

### 460 U 5

#### Economic Entomology

A, W, Sp. 5 cl.

Prereq.: Biol. 100 and Zool. 201, or equiv.

Survey of insects and close relatives that affect public  
 health crops, livestock, and the home; control methods,  
 including the safe use of insecticides with  
 environmental considerations. Holdsworth and Horn.

### 500 U G 5

#### Entomology for Biology Majors

Su. 3 cl., 2 2-hr. labs.

Not open to students with credit for 200, 200.01, or  
 200.02.

The biology, morphology, metamorphosis and habits of  
 insects; methods of collecting, preserving, culturing  
 and identifying the more important families. Hink.

### 561 U 3

#### Horticultural Entomology

Sp. 3 cl.

Prereq.: 460 and 10 additional cr. hrs. 200 level or above  
 in Entom. or Hort.

A detailed study of insects and mites attacking  
 horticultural crops. Holdsworth.

### 602\* U G 3

#### Biology of the Honey Bee

Sp. 3 cl.

Prereq.: 200.01 and Genetics 140 or equiv.

The behavior, social organization, morphology,  
 physiology, reproduction, diseases, and genetics of  
 the honey bee studied from a comparative and  
 evolutionary viewpoint. Rothenbuhler.

**611 U G 4****Field Entomology**

Su (1st Term). 3 all-day cls.

Given only at the Franz Theodore Stone Laboratory. Deals primarily with collecting, identification, and field methods; field trips are made to various islands of Lake Erie and the mainland.

**612 U G 4 or 5****Aquatic Entomology**

Sp.

a. Su. (4 cr. hrs.) Given only at Franz Theodore Stone Laboratory. 3 all-day cl.

b. Sp. (5 cr. hrs.) Given only on Columbus campus. 4 2-hr. cl.

Prereq.: 200.01 or 611 or equiv.

Designed for preparation in the teaching of biology or for research on aquatic resources; taxonomy and ecology of immature and adult aquatic insects are emphasized. Britt.

**621 U G 5****External Morphology of Insects**

A. 2 cl., 6 hrs. lab.

Prereq.: 200.01 and 200.02, or equiv.

A study of the comparative external morphology of insects with special emphasis on evolutionary trends and on taxonomic application of morphology. Borrer.

**631 U G 5****Insect Physiology**

A. 3 cl., 2 2-hr. labs.

Prereq.: 200.01 or equiv. and Chem. 235 or 241 and 243, or equiv.

The general physiology of insects and other arthropods; the laboratory will stress the use of insects to demonstrate fundamental physiological processes. Fisk.

**660 U G 5****Advanced Economic Entomology**

A. 3 cl., 2 2-hr. labs.

Prereq.: 460 or equiv.

The principles of insect control; field and laboratory studies will be made of major insect control problems. Horn.

**661 U G 5****Medical Entomology**

Sp. 3 cl., 2 2-hr. labs.

Prereq.: Microbiol. 607 or Zool. 610 or equiv.

A consideration of the recognition characteristics, biology, and control of insects and other arthropods of importance to the health of man, livestock, and wildlife. Foster.

**662 U G 5****Principles of Insect Toxicology**

W. 3 cl., 2 2-hr. labs.

Prereq.: 631 or equiv. or permission of instructor.

The properties of insecticides, modes of action, metabolism, toxicity factors, joint action, resistance, experimental procedures and interpretation of data. Collins.

**670 U G 4****General Acarology**

Su. 1 cl., 4-hr. lab.

An introduction to the morphology, development, and general biology of mites; laboratory consists of a taxonomic review of the families of Acari. Johnston.

**693 U 2-5 G 2-10****Individual Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 10 cr. hrs. for undergraduates and to a maximum of 30 cr. hrs. for graduates.

No more than 5 cr. hrs. may be counted toward an undergraduate Entomology major.

Individual work in the field of the chosen problems.

**694 U G 2-5****Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs. for undergraduates and to a maximum of 20 cr. hrs. for graduates.

Group work in the field of the chosen problems.

**741 U G 5****Insect Pathology**

Sp. 3 cl., 2 2-hr. labs.

Prereq.: Microbiol. 607 or equiv.

Diseases of insects, both infectious and non-infectious, and the resulting pathologies; the epizootiology of diseases and use of microorganisms for insect population management. Hink.

**751†\* U G 5****Systematic Entomology**

W. 2 cl., 6 lab. hrs.

Prereq.: 621.

A survey of all orders except Diptera, Lepidoptera, and Hymenoptera, with emphasis on the determination of insects to family and beyond; collecting and preserving insects. Borrer.

**752\* U G 5****Systematic Entomology**

W. 2 cl., 6 lab. hrs.

Prereq.: 621.

Continuation of 751, covering the Diptera, Lepidoptera, and Hymenoptera. Borrer.

**753†\* U G 5****Immature Insects**

W. 1 cl., 4 2-hr. lab.

Prereq.: 751 and 752 or equiv. and permission of instructor.

A survey of immature stages of insects with emphasis on the anatomy and taxonomy of holometabolous larvae. Holdsworth.

**H783 U 3-5****Honors Course**

Su, A, W, Sp.

Prereq.: 4th yr. standing with a grade of A in at least half of the courses in Biol. Sci. and an average of B in the remainder; permission of instructor under whose supervision the work is to be completed and the Arts and Sciences Honors Committee.

At least 2 qtrs. are required of candidates for the degrees Bachelor of Science or Bachelor of Arts with **distinction** in Entomology. Failure to receive a mark of S in this course is a disqualification for special honors.

Repeatable to a maximum of 15 cr. hrs.

A program of reading and research for each student with individual conferences, reports, and Honors thesis.

## 800 G 1

### Entomology Seminar

A, W, Sp. 1 1½-hr. cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

Faculty, graduate students, and outside speakers will participate; topics: recent advance in various entomological fields.

## 802\* G 5

### Research Methods: Living Insects

Sp. 3 cl., 2 2-hr. labs.

Prereq.: Permission of instructor.

Current field and laboratory research methods of trapping, sampling, handling, and rearing insects; conducting life history studies; and measuring environmental factors. Fisk.

## 821†\* G 5

### Internal Morphology of Insects

Sp. 2 cl., 3 2-hr. labs.

Prereq.: 621.

Internal structures of insects, including anatomy, function, histology, embryology, and metamorphosis; laboratory includes preparation of permanent microscopic slides of insect tissues. Fisk.

## 831\* G 5

### Advanced Insect Physiology

W. 2 cl., 2 3-hr. labs.

Prereq.: 631 or Zool. 432, or equiv.

Topics include insect integument, water balance, excretion, digestion, nutrition, respiration, growth and metamorphosis; the project type laboratory provides experience in techniques of insect physiology. Fisk.

## 841 G 5

### Biological Control

W. 3 cl., 2-hr. lab.

Prereq.: Permission of instructor.

The principles of biological control with particular reference to insects. Briggs and Stairs.

## 870 G 4

### Medical-Veterinary Acarology

Su. 1 cl., 4-hr. lab.

3 hrs. cl.-lab daily (Su. 3 wks).

The mites associated with man, domestic animals, and wildlife, stressing their ecology and behavior in relation to transmission of viral, rickettsial, bacterial, and protozoan diseases. Johnston.

## 871 G 4

### Agricultural Acarology

Su. 1 cl., 4-hr. lab.

8 hrs. cl.-lab. daily (Su. 3 wks.).

An intensive review of the mites associated with crops, ornamental plants, and stored food products with emphasis on taxonomy and ecology of these animals. Johnston.

## 891 G 2

### Interdepartmental Seminar in Environmental Biology

Su, A, W, Sp. 1 2-hr. cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 24 cr. hrs.

Selected topics treating the environmental aspects of organisms, populations, and ecosystems as they may relate to time, space, and human activities.

## 896 G 1-3

### Interdepartmental Seminar in Polar and Alpine Studies

Sp.

(See under Interdepartmental Seminars.)

## 897 G 1

### Interdepartmental Seminar in Natural Resources

A, W, Sp.

(See under Interdepartmental Seminars.)

## 999 G Arr.

### Research in Entomology

Su, A, W, Sp.

Research for thesis and dissertation purposes only.

## Environmental Biology

## 999 G Arr.

### Research in Environmental Biology

Su, A, W, Sp.

Research for thesis or dissertation purposes only.

## Food Science and Nutrition

Office: 122 Vivian Hall, 2121 Fyffe Road

**Professors** Kristoffersen (Chairman), Harpe, and Slatter; **Associate Professors** Allred, Blaisdell, Hansen, and Mikolajcik; **Assistant Professors** Josephson and Kenyon; **Instructor** Lindamood.

### GENERAL PREREQUISITES FOR COURSES NUMBERED 200

Unless otherwise indicated, the prerequisites for 200-level courses are 45 cr. hrs. in collegiate courses, exclusive of ROTC and Phys. Ed.; or specified course(s) numbered 100-199.

## 202 U 5

### Food and Mankind

Sp. 5 cl.

Food in modern civilization; role of science, industry, and government in meeting domestic and world needs; elements of food acceptance, quality, processing, and protection. Lindamood.

**289 U 3****Food Industries Field Experience**

Su, A, W, Sp.

Open only to students majoring in food science and nutrition.

Ten weeks practical experience or equivalent in an approved food plant or laboratory; written report required. Kristoffersen.

**GENERAL PREREQUISITES FOR COURSES  
NUMBERED 300 AND 400**

Unless otherwise indicated, the prerequisites for 300 and 400-level courses are 90 cr. hrs. in collegiate courses, exclusive of ROTC and Phys. Ed.; or specified course(s) numbered 100-399.

**Fundamentals of Food Engineering**

(See Agr. E. 310.)

(Offered in cooperation with the Dept. of Food Science and Nutrition.)

**Refrigeration Engineering in the Food Industry**

(See Agr. E. 411.)

(Offered in cooperation with the Dept. of Food Science and Nutrition.)

**493 U 3-5****Individual Studies**

Su, A, W, Sp. 9-, 12-, or 15-hr. lab.

H493 (honors) may be available to students enrolled in a college honors program or eligible for enrollment.

Prereq.: Junior standing.

Individual study course to permit undergraduate students to explore in depth selected areas of dairy technology.

**GENERAL PREREQUISITES FOR COURSES  
NUMBERED 500**

Unless otherwise indicated, the prerequisites for 500-level courses are 15 cr. hrs. in courses in the same discipline numbered 200 or higher or 10 cr. hrs. in courses numbered 200 or higher in the same discipline, plus 10 cr. hrs. in courses numbered 200 or higher in specified allied disciplines; or baccalaureate degree.

**521 U G 3****Food Components and Analysis**

A. 3 cl.

Prereq.: Chem. 235 or 242.

Composition and chemical properties of foods and food components; evaluation and utilization of analytical methods; effect of processing; regulations, laws, and agencies. Josephson.

**522 U G 3****Food Components and Analysis: Laboratory**

A. 1 cl., 2 3-hr. lab.

Prereq. or concur.: 521.

Application of modern analytical methods to foods and food components; determination of chemical phenomena and properties of foods; project studies, data interpretation and report writing. Josephson.

**Marketing Dairy Products**

(See Agr. Econ. 526.)

(Offered in cooperation with the Dept. of Food Science and Nutrition.)

**531 U G 3****Sensory Properties of Foods**

W. 1 cl., 2 2-hr. lab.

Prereq.: 521 or equiv.

Not open to students with credit for 411.

Fundamentals of sensory perception, taste and odor classification and threshold values; subjective and objective evaluation of foods; panel selection and interpretation of results; industrial applications. Josephson.

**541 U G 3****Physical Properties of Foods**

Sp. 2 cl., 1 2-hr. lab.

Prereq.: 521; Physics 112.

Elements of identification and measurement of physical properties of foods and application to food systems. Blaisdell.

**551\* U G 5****Technologies of Dairy Foods**

Sp. 3 cl., 2 2-hr. lab.

Prereq.: 521, 522; Microbiol. 509 or 607; or permission of instructor.

Not open the students with credit for 631, 632, 633, 634.

Scope, trends, and practices of industrial dairying; dairy foods formulation and processing; composition, quality, and materials control; distribution; health and nutritional aspects.

**594 U 3-5****Group Studies**

A, W, Sp.

Prereq.: Jr. standing.

Repeatable to a maximum of 10 cr. hrs.

Intensive study of selected areas in dairy technology not provided in other courses and appropriate to the needs of the students.

**GENERAL PREREQUISITES FOR COURSES  
NUMBERED 500**

Unless otherwise indicated, the prerequisites for 600-level courses are 15 cr. hrs. in courses in the same discipline numbered 300 or higher, or 10 cr. hrs. in courses numbered 300 or higher in the same discipline, plus 10 cr. hrs. in courses numbered 300 or higher in specified allied disciplines.

**Food Engineering Design and Control**

(See Agr. E. 611.)

(Offered in cooperation with the Dept. of Food Science and Nutrition.)

**621\* U G 3****Food Additives**

Sp. 3 cl.

Prereq.: 15 cr. hrs. in Food Science or related area.

Chemical and physical nature of food additives; functions and effects on chemical, rheological, microbiological, and nutritional properties of foods. Harper.

**622 U G 5****Food Sanitation**

W. 4 cl., 1 3-hr. lab.

Prereq.: Microbiol. 509 or 607.

Principles of sanitation applicable in the production, processing, distribution, and handling of food; relationship to food quality and safety. Lindamood.

**631\* U G 3****Food Systems I: Fluid Foods**

W. 3 cl.

Prereq.: 541, Agr. E. 310, or permission of instructor.

Integration of science and engineering principles to fluid foods and their unit operations, with emphasis on protein-lipid fluid food systems. Harper.

**633\* U G 3****Food Systems II: Concentrated and Frozen Foods**

Sp. 3 cl.

Prereq.: 631 or permission of instructor.

Not open to students with credit for 636.

Principles of science and engineering of concentrated and frozen foods and their unit operations.

**634†\* U G 3****Food Systems III: Fermented and Lipid Foods**

W. 3 cl.

Prereq.: 521, Microbiol. 509 or 607, or permission of instructor.

Chemical, physical, and microbiological phenomena of fermented and lipid foods as related to manufacturing and storage practices and products characteristics. Kristoffersen.

**637† U G 3****Food Systems IV: Laboratory**

A, W. 1 cl., 2 3-hr. labs.

Prereq.: 631, 633 or 634 or concur.

Not open to students with credit for 632.

Repeatable to a maximum of 6 cr. hrs.

Unit processes in fundamentals of food systems and food fabrication and development; equipment use; chemical, physical, and microbiological measurements of product control and storage changes.

**693 U G 3-5****Individual Studies**

Su, A, W, Sp. 9-, 12-, or 15-hr. lab.

H693 (honors) may be available to students enrolled in a college honors program or eligible for enrollment.

Prereq.: Food science and nutrition 4th yr. standing and permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

Individual project studies of current problems; planning, conducting, and reporting research.

**695 U G 3****Seminar**

A. 3 cl.

Prereq.: Food science and nutrition 4th yr. standing.

Not open for grad. credit to majors in food science and nutrition.

Analysis of technical problems in food science; fostering of creative thinking to the approach and solution of problems; preparation and oral presentation of papers. Harper.

**GENERAL PREREQUISITES FOR COURSES  
NUMBERED 700**

Unless otherwise indicated, the prerequisites for 700-level courses are 15 cr. hrs. in courses in the same discipline numbered 400 or higher, plus additional specified course(s) numbered 600 or higher.

**701\* U G 4****Food Contaminants and Toxicants**

W. 4 cl.

Prereq.: Microbiol. 509 or 607.

Biological and chemical contaminants and naturally occurring toxicants of foods public health significance; protection of foods. Mikolajcik.

**723†\* U G 5****Food Structure and Interactions**

W. 3 cl., 2 3-hr. labs.

Prereq.: 15 cr. hrs. in Food Science or related areas.

Microstructure and texture of foods; relationship to food components and interactions, and physical properties of foods; application of light and electron microscopy. Hansen.

**731\* U G 3****Food Processing Wastes:  
Treatment and Utilization**

A. 3 cl.

Prereq.: Biochem. 511, Microbiol. 509 or 607.

Chemical, physical, and biological composition of food plant wastes, principles of waste treatment; alternative processes and comparative efficiencies; utilization of waste products. Harper.

**741\* U G 3****Food Thermodynamics**

W. 3 cl.

Prereq.: 723, Biophys. 642, Chem. 521 or permission of instructor.

Thermodynamic, kinetic, and transport phenomena in food systems. Blaisdell.

**761 U G 5****Advanced Nutrient Utilization I**

W. 5 cl.

Prereq.: Biochem. 511 or equiv. and Home Ec. 310 or Animal, Dairy, Poultry Sc. 430 or equiv.

In-depth treatment of digestion, absorption, transport, and utilization of dietary carbohydrates and fat for energy production and fat deposition in man and other higher animals. Allred.

**762 U G 5****Advanced Nutrient Utilization II**

Sp. 5 cl.

Prereq.: 761.

In-depth treatment of digestion, absorption, transport, and utilization of proteins, amino acids, and vitamins in man and other higher animals; energy reactions and requirements. Allred.

**794 U G 3-5****Group Studies**

Su, A, W, Sp.

Repeatable to a maximum of 10 cr. hrs.

Intensive study of selected areas of dairy food science not provided in other courses and appropriate to the needs of the students.

GENERAL PREREQUISITES FOR COURSES  
NUMBERED 800 AND 900

Unless otherwise indicated, the prerequisites for 800 and 900-level courses are 30 cr. hrs. in courses in the same discipline, or 20 cr. hrs. in the same discipline, plus 25 cr. hrs. in specified allied disciplines.

**801\*** **G 5****Spore-Forming Bacteria in Food**

Su. 3 cl., 2 2-hr. lab.

Prereq.: Microbiol. 636.

Not open to students with credit for 830.01.

Aerobic and anaerobic spore-forming bacteria in food; fundamentals of sporulation and germination processes; significance to food industry; control. Mikolajcik.

**803†\*** **G 5****Food Fermentations**

Su. 3 cl., 2 3-hr. lab.

Prereq.: 631, 633 or permission of instructor.

Not open to students with credit for 830.04.

Principles of food fermentations; pathways and kinetics of microbial reactions; design and control of fermentation reactors. Blaisdell and Harper.

**821†\*** **G 3****Food Lipids**

A. 3 cl.

Prereq.: 633, 723 or permission of instructor.

Not open to students with credit for 830.03.

Chemical, physical and biological properties of food lipids. Kristoffersen.

**822†\*** **G 3****Food Proteins**

Sp. 3 cl.

Prereq.: 723 or permission of instructor.

Not open to students with credit for 830.02.

Sources of chemical, physical, and biological properties of food proteins; effect of food composition, handling and processing on protein characteristics and functionalities. Josephson.

**833** **G 5****Research Methods in Food Science**

Su. 3 cl., 2 3-hr. lab.

Prereq.: Permission of instructor.

Not open to students with credit for 830.05.

Principles and application of selected instrumental methods of analysis of food systems; visual, ultraviolet, infrared spectroscopy; partition, absorption, gel permeation, gas liquid chromatography, electrophoresis, radiosotopes. Harper.

**850** **G 1****Seminar**

A, W, Sp. 1 cl.

Graduate student-staff participation in a study of teaching and research trends and opportunities; critical analysis of research approaches, findings, and publications.

850.01 Food Science

850.02 Nutrition

**898** **G 1****Interdepartmental Seminar  
in Nutrition and Food Technology**

Sp.

(See under Interdepartmental Seminars.)

**998** **G Arr.****Research: Thesis**

Su, A, W, Sp.

Research for thesis purposes only.

**999** **G Arr.****Research: Dissertation**

Su, A, W, Sp.

Research for dissertation purposes only.

**Forestry****(SCHOOL OF NATURAL RESOURCES)**

Office: 140 Howlett Hall, 2001 Fyffe Court

**Professors** Gatherum (Chairman), Cowen, Kriebel, Larson, and Touse; **Associate Professors** Brown, Vimmerstedt, Vogt (Associate Chairman, Wooster), and Whitmore; **Assistant Professor** Houston.

GENERAL PREREQUISITES FOR COURSES  
NUMBERED 200

Unless otherwise indicated, the prerequisites for 200-level courses are 45 cr. hrs. in collegiate courses, exclusive of ROTC and Phys. Ed.; or specified course(s) numbered 100-199.

**221** **U 5****Coniferous Dendrology**

A. 3 cl., 2 2-hr. labs.

Prereq.: Bot. 102.

A study of the principal species of Gymnosperms in the United States with emphasis on identification, range, and silvical characteristics. Cowen.

**222** **U 5****Hardwood Dendrology**

Sp. 3 cl., 2 2-hr. labs.

Prereq.: Bot. 102.

A study of the principal species of Angiosperms in the United States with emphasis on identification, range, and silvical characteristics. Cowen.

**223** **U 5****Silvics**

W. 5 cl.

Prereq.: Bot. 102.

The effect of site factors on forest vegetation and action of forest cover on the site; characteristics of individual trees and forest stands. Brown, Gatherum, Houston, Larson, Vimmerstedt, and Vogt.

GENERAL PREREQUISITES FOR COURSES  
NUMBERED 300 AND 400

Unless otherwise indicated, the prerequisites for 300- and 400-level courses are 90 cr. hrs. in collegiate courses, exclusive of ROTC and Phys. Ed.; or specified course(s) numbered 100-399.

**310 U 5****Principles of Forestry**

A. 3 cl., 2 2-hr. lab.

History of American forests, their character and occurrence; underlying fundamentals of silviculture and forest management; introduction to forest management and protection. Touse.

**321 U 5****Silviculture**

A. 5 cl.

Prereq.: 221, 222, and 223.

A study of the methods of handling the forest on a permanent basis to assure the reproduction and proper growth of tree crops. Cowen.

**323 U 5****Forest Mensuration**

W. 5 cl.

Prereq.: 221, 222, and 223.

The measurement of the forest and forest products.

**325 U 5****Forest Management**

Sp. 5 cl.

Prereq.: 321 and 323.

A study of the practical problems of managing woodland property, both from the technical and the financial standpoint.

**431 U 5****Wood Structure and Properties**

A. 5 cl.

Prereq.: 221 and 222.

The classification and identification of the important timber species based upon wood structure and properties; defects in wood; moisture relationships; physical and chemical properties. Touse and Whitmore.

**432 U 5****Manufacturing Forest Products**

W. 5 cl.

Intensive study of the manufacturing industries based on wood products or products derived from wood by chemical and other means. Touse.

**433 U 5****Analysis of Forest Industry Management**

Sp. 5 cl.

Prereq.: 431 and 432.

A survey of the common problems encountered by managers of the wood-using industries; emphasis on sources of information and methods of solution. Touse.

GENERAL PREREQUISITES FOR COURSES  
NUMBERED 500

Unless otherwise indicated, the prerequisites for 500-level courses are 15 cr. hrs. in courses in the same discipline numbered 200 or higher, or 10 cr. hrs. in courses numbered 200 or higher in the same discipline, plus 10 cr. hrs. in courses numbered 200 or higher in specified allied disciplines; or baccalaureate degree.

**593 U G 2-5****Individual Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

H593 (honors) may be available to students enrolled in a college honors program or eligible for enrollment.

Special problems in the field of forestry and forest products.

GENERAL PREREQUISITES FOR COURSES  
NUMBERED 800 AND 900

Unless otherwise indicated, the prerequisites for 800- and 900-level courses are 30 cr. hrs. in courses in the same discipline, or 20 cr. hrs. in the same discipline, plus 25 cr. hrs. in specified allied disciplines.

**999 G Arr.****Research in Forestry**

Su, A, W, Sp.

Research for thesis and dissertation purposes only.

**French**

Office: 248 Dieter Cunz Hall of Languages, 1841 Millikin Road

**Professors** Griffin (Chairman), Astier, Bulatkin, Carlut, Cottrell, Demorest (Emeritus), Havens (Emeritus), Keller, and Meiden; **Assistant Professors** Ames, Bonin, Corbin, Williams, and Winthrop.

**101 U 5****Elementary French**

Su, A, W, Sp. 5 cl.

Elements of French grammar, with oral and written exercises; attention to ear training and oral practice; elementary reading based on French geography, history, and customs.

**102 U 5****Elementary French**

Su, A, W, Sp. 5 cl.

Prereq.: 101.

The elements of French grammar with abundant oral and written exercises; development of conversational skill; reading, vocabulary building, attention to French idioms.

**103 U 5****Intermediate French**

Su, A, W, Sp. 5 cl.

Prereq.: 102.

Course conducted in French.

Review of salient points of elementary grammar, attention to French idioms; reading of short stories, plays, and novels.



**104 U 5****Intermediate French**

Prereq.: 103 or 112.

The following courses are not open to students with credit for 104, and only one of the decimal subdivisions may be taken for credit.

**104.01 Basic Course**

Su, A, W, Sp. 5 cl.

Required of French majors and recommended for students who intend to continue in French.

Not open to students with credit for 104 or any other 104 decimal subdivision.

Reading of French short stories, plays, and novels with attention to literary appreciation; development of basic language skills; course conducted in French.

**Students not planning to continue in French may substitute any one of the following decimal subdivisions for 104.01.**

**104.02 Conversation**

A, Sp. 5 cl.

Not open to students with credit for 104 or any other 104 decimal subdivision.

Emphasis on speaking and aural comprehension with special attention to practical situations.

**104.03 The French Now**

A. 5 cl.

Not open to students with credit for 104 or any other 104 decimal subdivision.

Readings in current periodicals, newspapers, and other primary sources; texts in French, discussion in French and English.

**104.04 Civilization**

W. 5 cl.

Not open to students with credit for 104 or any other 104 decimal subdivision.

Aspects of French civilization: geography, history, social developments, and the arts; readings and discussion in French.

**104.05 French Attitudes Toward Science and Philosophy**

Sp. 5 cl.

Not open to students with credit for 104 or any other 104 decimal subdivision.

Readings in science, philosophy, and literature; texts in French; discussion in French and English.

**104.06 Scientific Reading**

W. 5 cl.

Not open to students with credit for 104 or any other 104 decimal subdivision.

Intensive reading of scientific materials from current French journals in the physical and biological sciences

**105 U 5****Elementary French Conversation and Composition**

Su, A, W, Sp. 5 cl.

Prereq.: 104.

Course conducted in French.

Intensive practice in oral and written French, based on texts and periodicals concerned with French life of today; grammar and idiom review.

**110 U 5, 10****Intensive Elementary French**

A, W, Sp. 10 cl.

Prereq.: Permission of dept.

Not open to students with credit for 102. Students with credit for 101 or equiv. may not register for more than 5 cr. hrs.

Elementary French for students wishing to acquire the basic skills in one quarter; intensive drill in form, syntax, vocabulary, and idiom; equivalent to 101 and 102.

**112 U 5, 10, 15****Intensive French**

Su. 15 cl. Enrollment limited to 25 students.

Prereq.: Permission of chairman.

Full time of student and full fees required. Equiv. of 101, 102, 103. Students with credit for 101 or the equiv. may not register for more than 10 cr. hrs. Students with credit for 101 and 102 or the equiv. may not register for more than 5 cr. hrs. Students with credit for 103 or the equiv. may not register for credit. Elementary and intermediate French; intensive drill in form, syntax, vocabulary, and idiom; reading of short stories, novels, and plays.

**162 U 5****Elementary-Intermediate French for Selected Students**

W. 5 cl.

Prereq.: Grade of A in 101 and permission of dept.

Successful completion of 101-162-163 fulfills language requirements and satisfies prereq. for 400-level literature courses.

**163 U 5****Elementary-Intermediate French for Selected Students**

Sp. 5 cl.

Prereq.: 162.

Successful completion of 101-162-163 fulfills language requirements and satisfies prereq. for 400-level literature courses.

**193 U 1-15****Individual Studies**

Su, A, W, Sp.

Prereq.: Permission of dept.

Repeatable to a maximum of 30 cr. hrs.

**194 U 1-15****Group Studies**

Su, A, W, Sp.

Prereq.: Permission of dept.

Repeatable to a maximum of 30 cr. hrs.

**271 U 3****French Classics in Translation: The Middle Ages to the Mid-Eighteenth Century**

Su, A. 3 cl.

Prereq.: Engl. 100 or equiv.

Does not count toward a French major.

Reading, analysis, and discussion of major French works in translation, beginning with the Song of Roland and continuing with authors such as Montaigne, Pascal, Moliere, Voltaire, Rousseau.

**272 U 3****French Literature in Translation**

Su, W. 3 cl.

Prereq.: Engl. 100 or equiv.

Does not count toward a French major.

Readings of the late 18th and 19th centuries; treatment of the Confessions of Rousseau, novels by Balzac, Stendhal, and Flaubert.

**273 U 3****Modern French Literature in Translation**

Su, Sp. 3 cl.

Prereq.: Engl. 100 or equiv.

Does not count toward a French major.

Discussion of readings in English of 20th century French masterpieces; treatment of the French novelists and dramatists, Proust, Gide, Malraux, Sartre, and Camus.

**401 U 3****Review Grammar and Composition**

Su, A, W, Sp. 3 cl.

Prereq.: 105.

Review of French grammar; composition on assigned topics and practice in translation.

**402 U 3****Intermediate French Conversation and Composition**

A, Sp. 3 cl.

Prereq.: 105.

Vocabulary building, practice in speaking French, conversation, and composition dealing with social and economic aspects of French life.

**403 U 3****Intermediate French Conversation and Composition**

Su, W. 3 cl.

Prereq.: 105.

Vocabulary building, practice in speaking French, conversation, and composition dealing with intellectual and artistic aspects of French life.

**404 U 5****French Pronunciation**

Su, A, W, Sp. 5 cl.

Prereq.: 105.

Not open to students with credit for (632).

Formation of French sounds, rules of pronunciation and diction; lectures and practical exercises; use of phonetic symbols.

**421 U 5****Introduction to Modern French Literature**

Su, A, W, Sp. 5 cl.

Prereq.: 104.

Not open to students with credit for (417).

Rapid reading and discussion of French literary movements and masterpieces of the 19th century and their relation to modern France.

**422 U 5****Masterpieces of French Literature: Middle Ages and Renaissance**

A, Sp. 5 cl.

Prereq.: 421.

**423 U 5****Masterpieces of French Literature: 17th and 18th Centuries**

A, W, Sp. 5 cl.

Prereq.: 421.

**571 G 5****Basic French for Graduate Students**

Su, A, W, Sp. 5 cl.

Prereq.: Graduate standing.

Credit does not apply to the minimum number of hours required for the master's or doctoral degrees. No audit.

Designed primarily for students who have no formal preparation in French; covers basic grammar and vocabulary.

**572 G 3****French for Research I**

Su, A, W, Sp. 3 cl.

Prereq.: Grade of C or above in 571, or equiv. preparation demonstrated by a placement test.

Credit does not apply to the minimum number of hours required for the master's or doctoral degrees. No audit.

Repeatable twice.

Satisfactory completion of this course (grade of A or B) may be accepted by the student's dept. as evidence of a dictionary reading knowledge in fulfillment of Ph.D. language requirement.

**573 G 3****French for Research II**

Su, W. 3 cl.

Prereq.: Grade of A or B in 572, or equiv. preparation demonstrated by a placement test.

Credit does not apply to the minimum number of hours required for the master's or doctoral degrees. No audit. Repeatable twice.

Satisfactory completion of this course (grade of A or B) may be accepted by the student's dept. as evidence of a dictionary reading knowledge in fulfillment of Ph.D. language requirement.

**601 U G 5****Modern French Syntax**

Su, A, W, Sp. 5 cl.

Prereq.: 401.

Systematic review of French grammar with composition and other exercises, based on contemporary authors; modern tendencies in syntactic analysis. Meiden.

**602 U G 3****French Translating**

Su, A, W, Sp. 3 cl.

Prereq.: 601 or equiv.

Translation from French to English and English to French.

**603 U G 3****Advanced Spoken and Written French**

Sp. 3 cl.

Prereq.: 402, 403, and 601 or equiv.

Intensive practice in speaking and writing French; based on contemporary usage. Carlut.

**604 U G 3****Advanced French Pronunciation and Phonostylistics**

Su, W. 2 cl., 1 lab. hr.

Prereq.: 404 or permission of instructor.

Training in auditory and oral aspects of French pronunciation; special emphasis on analysis of different types of spoken French.

**621 U G 5****French Literature of the Renaissance**

W. 5 cl.

Prereq.: 421 and either 422 or 423.

Selections from Marot, Rabelais, the Pleiade and Montaigne as they reflect the age of humanism and illustrate the transition from medieval to modern forms and ideas. Cottrell.

**622 U G 5****French Classicism, 1600-1715**

Sp. 5 cl.

Prereq.: 421 and either 422 or 423.

The formation of the classic spirit; the perfection of dramatic form and the 17th century portrait of man. Williams.

**623 U G 5****French Literature of the Enlightenment**

A. 5 cl.

Prereq.: 421 and either 422 or 423.

A study of the ideas of the eighteenth century in their relation to modern times; special emphasis on Montesquieu, Voltaire, Diderot, and Rousseau. Williams.

**624 U G 5****The Romantic Period in French Literature, 1800-1850**

W. 5 cl.

Prereq.: 421 and either 422 or 423.

The development of romanticism and rise of realism in the first half of the 19th century in the novel, poetry, and drama. Carlut.

**625 U G 5****French Literary Currents 1850-1914**

Sp. 5 cl.

Prereq.: 421 and either 422 or 423.

Realism, naturalism, symbolism, and the movements of reaction in the novel and in literary criticism. Cottrell.

**626 U G 5****Contemporary French Literature**

Sp. 5 cl.

Prereq.: 421 and either 422 or 423.

20th century literary currents, and their significance, with special attention given to the novel; Proust, Gide, Malraux, Mauriac, Bernanos, Saint-Exupéry, Camus, Sartre, and others. Ames.

**627 U G 3****Contemporary French Drama**

Su, W. 3 cl.

Prereq.: 421 and either 422 or 423.

Plays of Lenormand, Rostand, Claudel, Giraudoux, Cocteau, Montherlant, Anouilh, Sartre, Camus, and Ionesco; the different theatres and directors from Copeau to the present day. Ames and Astier.

**628 U G 3****Modern French Poetry**

A. 3 cl.

Prereq.: 421 and either 422 or 423.

Source and processes of poetic creations as exemplified in selected works of French poets from Baudelaire to the present time. Ames and Astier.

**629 U G 3****Explication de textes**

W, Sp. 3 cl.

Prereq.: 421 and either 422 or 423.

Repeatable to a maximum of 6 cr. hrs.

Intensive linguistic and literary exploration of representative passages from modern French authors.

**631 U G 2-5****French Literature**

Su. 3 cl.

Prereq.: 421 and either 422 or 423.

Repeatable to a maximum of 15 cr. hrs.

**640†\* U G 5****Les origines de la civilisation française**

W. 5 cl.

Prereq.: 401 and 402 or 403.

Course conducted in French.

Major developments of French culture and civilization from its beginning to 1900.

**641 U G 3****La civilisation française contemporaine**

A. 3 cl.

Prereq.: 401 and 402 or 403.

Course conducted in French.

Life, institutions, and culture of contemporary France. Carlut.

**693 U G 1-15****Individual Studies**

Su, A, W, Sp. Arr.

Prereq.: Permission of instructor.

Repeatable to a maximum of 30 cr. hrs.

**694 U G 1-15****Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 30 cr. hrs.

**702 U G 3****Advanced Translation and Comparative Stylistics**

A. 3 cl.

Prereq.: 602 or permission of instructor.

A comparative study, through intensive translation, of the stylistic resources of French and English. Astier.

**H783 U 3-5****Honors Course in French**

Su, A, W, Sp.

Prereq.: 4th yr. standing with a grade of A in at least half of the French courses and an average of B in the remainder permission of instructor under whose supervision the work is to be completed and the Arts and Sciences Honors Committee.

Repeatable to a maximum of 15 cr. hrs.

Offers undergraduates with special aptitudes a greater opportunity to do independent study than is possible in the ordinary course; work in conference, library, or phonetics laboratory.

**811 G 3****The French Language: Introduction**

A. 3 cl.

Prereq.: M. A. Candidates in French; others by permission of instructor.

A brief external history of the language along with an introduction to linguistic concepts based on modern French materials. Winthrop.

**815\* G 5****History of the Provençal Language**

A. 5 cl.

Prereq.: 811 and a knowledge of Latin or permission of instructor.

The major factors of change in the evolution of the Provençal language from Roman times to the present. Keller.

**816 G 3****Modern French and its Historical Background**

A. 3 cl.

Prereq.: 811 or permission of instructor.

Examination of recent developments, pronunciation, word-formation, and sentence structure. Keller.

**817 G 3****Old French and its Historical Background**

W. 3 cl.

Prereq.: 816.

Using materials from the 12th and 13th centuries, the structure of Old French will be described from the point of view of phonology, morphology, and syntax. Winthrop.

**818 G 3****The French Language in the Renaissance and Classical Periods**

Sp. 3 cl.

Prereq.: 817.

A study of modern French from the formative period in the late Middle Ages in its subsequent development up to 1827. Keller.

**819 G 3****Historical Grammar of French**

Sp. 3 cl.

Prereq.: 817 and permission of instructor.

A diachronic study of the internal development of French from the Vulgar Latin to the modern period. Winthrop.

**821 G 3****Old French Literature**

W. 3 cl.

Main currents of Old French Literature to 1300; reading of the Chanson de Roland; Yvain of Chretien de Troyes, Beroul's Tristan, representative lyrics. Bulatkin.

**822 G 3****Middle French Literature**

Sp. 3 cl.

Prereq.: 821.

Survey from about 1300 to 1465; Machaut, Froissart, Deschamps, Christine de Pisan, Charles d'Orleans, Villon, Anglo-French literary relations, with special reference to Chaucer. Keller.

**823\* G 3****Topics and Problems in 16th Century French Literature**

Sp. 3 cl.

Prereq.: 621 or permission of instructor.

Intensive exploration of a special topic or problem, with readings in literary works and in relevant criticism and scholarship. Cottrell.

**824 G 3****Topics and Problems in 17th Century French Literature**

A. 3 cl.

Prereq.: 622 or permission of instructor.

Intensive exploration of a special topic or problem, with readings in literary works and in relevant criticism and scholarship. Williams.

**825\* G 3****Topic and Problems in 18th Century French Literature**

A. 3 cl.

Prereq.: 623 or permission of instructor.

Intensive exploration of a special topic or problem, with readings in literary works and in relevant criticism and scholarship.

**826 G 3****Topics and Problems in 19th Century French Literature**

Sp. 3 cl.

Prereq.: 624, 625, or permission of instructor.

Intensive exploration of special topics or problems with readings in literature works in relevant criticism and scholarship. Carlut.

**827 G 3****Topics and Problems in 20th Century French Literature**

Sp. 3 cl.

Prereq.: 626 or equiv.

Intensive study of a specific topic or problem with readings of selected literary and critical works. Astier and Amos.

**828†\* G 5****Old Provençal**

A. 5 cl.

Prereq.: 813 or Span. 813.

Origin of the troubadour lyric; its history, as to form and content, in the 11th and 12th centuries; elements of phonology and morphology. Bulatkin.

**829†\* G 5**

### Old Provençal

W. 5 cl.

Prereq.: 828.

Troubadour lyric in the 13th century; increased attention to non-lyric genres, and to prose; continuation of linguistics, with greater emphasis on semantic problems. Bulatkin.

**831 G 2-5**

### Seminar in French Literature

Su (2-3 cr. hrs.), A, Sp. (3-5 cr. hrs.).

Prereq.: Permission of instructor.

**832 G 2-5**

### Seminar in French Literature

Su (2-3 cr. hrs.), W, Sp. (3-5 cr. hrs.).

Prereq.: Permission of instructor.

**833 G 3-5**

### Seminar in French Literature

Sp.

Prereq.: Permission of instructor.

**842†\* G 5**

### Topics and Problems in Provençal Literature from the 16th to the 20th Century

Sp. 5 cl.

Prereq.: 821 or 822 or permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

Intensive exploration of a special topic or problem, with readings in literary works from selected periods of Provençal literature.

**843†\* G 3**

### Major Authors of the 16th Century

Sp. 3 cl.

Prereq.: 621 or permission of instructor.

Intensive exploration of the works of outstanding authors of the period. Cottrell.

**844 G 3**

### Major Authors of the 17th Century

W. 3 cl.

Prereq.: 622 or permission of instructor.

Intensive exploration of representative works. Williams.

**885 G 5**

### Introduction to Methods in the History and Criticism of Literature

A. 4 or 5 cl.

Selected readings in basic literary history, criticism, and theory, with practice in the use of standard bibliographical aids to scholarship. Williams.

**886\* G 3**

### Bibliography and Method

Sp. 3 cl.

A course to acquaint graduate students with tools, problems, and methods of linguistic and literary research.

### Medieval and Renaissance Culture

(See Medieval and Renaissance Studies 888.)

### Medieval and Renaissance Literature

(See Medieval and Renaissance Studies 889.)

**993 G 1-5**

### Individual Studies

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

**994 G 1-15**

### Group Studies

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 30 cr. hrs.

Investigation of minor problems in the various fields of French literature and language.

**999 G Arr.**

### Research in French Language or Literature

Su, A, W, Sp.

Research for thesis and dissertation purposes only.

## Genetics

Office: 105 Botany and Zoology Building, 1735 Neil Avenue

**Professors** Griffing (Chairman), Fechheimer, Harvey, House, Jaap, Kriebel, Paddock, Plaine, Rothenbuhler, Weaver, and Young; **Associate Professors** Birky, Swiger, and Skavaril; **Assistant Professors** Allaire and Perlman; **Instructor** Essman.

**140 U 5**

### Introduction to Genetics

A, W, Sp. 5 cl.

Prereq.: Biol. 100.

Not open to students with credit for 314.

An introductory course emphasizing applied aspects of genetics, primarily for students outside the College of Biological Sciences. Essman.

**500 U G 5**

### General Genetics

A, W, Sp. 5 cl.

Prereq.: Biol. 100 plus 5 additional cr. hrs. in Biol. Sciences and Math. 150 or equiv.

Not open to students with credit for 314, 630 or Biol. 314 or 630.

The principles of genetics, including molecular genetics, transmission genetics of prokaryotes and eukaryotes, developmental and non-chromosomal genetics, and the genetics and evolution of populations. Birky and House.

**600 U G 3****Genetics Laboratory**

A, Sp. 3 2-hr. labs.

Prereq.: 500 and permission of instructor.

A laboratory approach to fundamental genetics; concepts and techniques involved in collection and analysis of data from exercises utilizing *Drosophila*, *Mormoniella*, *Sordaria*, and *Neurospora*. Essman.

**History of Biology**

(See Botany 601.)

**611 U G 5****Molecular Genetics**

Sp. 5 cl.

Prereq.: One course in Biochem. and background in one or more of the following areas: Genetics, Microbiol., Developmental Biol.; or permission of instructor.

Not open to students with credit for Biochem. 611.

(Cross-listed in the Dept. of Biochem.)

Molecular mechanisms of DNA replication, mutation, recombination, and repair; analysis of gene structure; metabolic and genetic control mechanisms; procaryotic and eucaryotic systems are analyzed. Marzluf and Perlman.

**631 U G 5****The Cytological Basis of Genetics**

W. 2 cl., 3 2-hr. labs.

Prereq.: 500 or equiv.

Not open to students with credit for Biol. 631.

Documentation of the correlation between genetic principles and chromosome behavior by studying the mitotic and meiotic cells of several organisms with oil immersion microscopy. Paddock.

**632 U G 5****Plant Genetics**

A. 3 cl., 2 2-hr. labs.

Prereq.: 500, Bot. 101 or 102 or 500, and 10 additional cr. hrs. in Biological Sciences.

Not open to students with credit for Bot. 650.

Effects of lethals, linkage, heterogony, introgression, polyploidy, self-incompatibility, and cytoplasm; laboratory experience with aceto-carmin smears, colchicine, progeny tests, random number tables, and herbarium specimens. Paddock.

**650 U G 5****Analysis and Interpretation of Biological Data I**

A, Sp. 4 cl., 1 2-hr. lab.

Prereq.: Math. 150 or equiv. and 15 cr. hrs. of courses at the 300- level or higher in a dept. of the College of Agriculture and Home Economics or in the College of Biological Sciences.

Not open to students with credit for Biol. 650.

Methods of analyzing biological data including: sampling, descriptive statistics, distributions, group comparisons, statistical inference, one-way and nested analysis of variance and linear regression and correlation. Skavaril.

**651 U G 5****Analysis and Interpretation of Biological Data II**

Su, W. 5 cl.

(Given in Su. Qtr. at Wooster only)

Prereq.: 650 or Biol. 650.

Not open to students with credit for Biol. 651.

Methods used in analyzing data classified in two or more ways: Latin-square, split-plot and factorial designs, analysis of covariance, data transformations, multiple regression and least-squares. Harvey and Weaver.

**660\* U G 5****Computer Applications in Genetics**

W. 4 cl., 1 2-hr. lab.

Prereq.: 500 or equiv., 650 or equiv., and Compu. and Info. Sc. 241 or equiv.

Simulation techniques and applications of modern computer methodology to problems in genetics. Skavaril.

**693 U 2-5 G 2-10****Individual Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs. for undergraduate credit and to a maximum of 35 cr. hrs. for graduate credit.

Individual work in the field of the chosen problems.

- Cytogenetics and cellular genetics. Birky, Byers, Essman, Fechheimer, Paddock, and Perlman.
- Physiological and developmental genetics. House.
- Mathematical and population genetics. Allaire, Griffing, Harvey, Jaap, Kriebel, Skavaril, Swiger, and Young.
- Behavior genetics. Rothenbuhler.

**694 U 2-5 G 2-10****Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs. for undergraduate credit and to a maximum of 35 cr. hrs. for graduate credit.

Group work in the field of the chosen program.

(See areas in 693.)

**720 U G 5****Genetics and Biogenesis of Cell Organelles**

W. 5 cl.

Prereq.: Background in Genetics, cell biol., and Biochem., or permission of instructor.

Basic concepts and current literature on the biogenesis of prokaryotic and eukaryotic organelles and the role of nonchromosomal information in organellar, cellular, and organismal heredity. Birky and Perlman.

**Genetics of Animal Populations**

(See Animal Science 720, Dairy Science 720, and Poultry Science 720.)

**730\* U G 3 or 5****Cytogenetics**

Sp. 3 cl., 2 2-hr. labs.

Prereq.: 500 and 631 or Biol. 630 and 631.

Not open to students with credit for Biol. 730.

Origin, transmissibility, and effects of chromosomal aberrations; their usefulness in practical breeding and in attacks on fundamental cytogenetic problems. Paddock.

**H783 U 3-5**

**Honors Course**

Su, A, W, Sp.

Prereq.: 4th yr. standing with a grade of A in at least half of the courses in Biol. Sci. and an average of B in the remainder; permission of instructor under whose supervision the work is to be completed and the Arts and Sciences Honors Committee.

At least 2 qtrs. are required of candidates for the degree Bachelor of Science or Bachelor of Arts with distinction in Genetics. Failure to receive a mark of S in this course is a disqualification for special honors.

Repeatable to a maximum of 15 cr. hrs.

A program of reading and research for each student with individual conferences, reports, and Honors thesis.

**800 G 1**

**Genetic Seminar**

A, W, Sp. 1 1/2-hr. cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

Faculty, graduate students, and outside speakers will participate. Young.

**811\* G 3**

**Advanced Topics in Molecular Genetics**

A. 1 2-hr. cl.

Prereq.: 611 or Biochem. 611.

Not open to students with credit for Biochem. 811.

(Cross-listed in the Dept. of Biochem.)

An examination of the current research in molecular genetics by selective reading assignments and critical analysis during class discussion periods. Merzluf and Perlman.

**Current Topics in Animal Genetics**

(See Animal Science 820, Dairy Science 820, and Poultry Science 820.)

**831\* G 5**

**The Nature of Gene Action**

Sp. 5 cl.

Prereq.: 1 qtr. each of Physiol., Embryol., and Biochem.

Not open to students with credit for Biol. 831.

A study of the action of genes at all levels of expression with special emphasis on the role of genes in developmental processes. House.

**832 G 5**

**Mathematical Genetics**

Sp. 5 cl.

Prereq.: 30 cr. hrs. in Genetics, Math., and Statistics.

Not open to students with credit for Biol. 832 or (816).

The construction of mathematical models, use of path coefficients, generation matrices, least-squares and maximum likelihood methods for estimating genetic parameters and breeding values in quantitative genetics. Harvey.

**840†\* G 3**

**Transmission Genetics Theory**

W. 3 cl.

Prereq.: 500 or equiv.; Statist. 520 and 521, or equiv., and permission of instructor.

The mathematical basis of transmission genetics to include any level of polysomic inheritance. Griffing.

**841\* G 3**

**Quantitative Genetics and Selection Theory**

A. 3 cl.

Prereq.: 500 or equiv.; Statist. 520 and 521, or equiv., and permission of instructor.

The genetical basis for complexly inherited, quantitative, biological variables and the theory of truncation selection as it pertains to such variables. Griffing.

**Behavior Genetics**

(See Zoology 840.)

**850 G 5**

**Theoretical and Experimental Population Genetics**

W. 5 cl.

Prereq.: 12 cr. hrs. of college level Math.; 5 cr. hrs. of applied or mathematical statistics; 1 course in general genetics.

Discussion of mathematical theories in population genetics and experimental works on natural and laboratory populations. Young.

**890 G 2**

**Interdepartmental Seminar in Developmental Biology**

A, W, Sp. 1 2-hr. cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 12 cr. hrs.

Students will present oral reports and lead discussion on research progress in specific areas of developmental biology.

**999 G Arr.**

**Research in Genetics**

Su, A, W, Sp.

Research for thesis and dissertation purposes only.

## Geodetic Science

Office: Cockins Hall, 1958 Neil Avenue

**Professors** Uotila (Chairman), Moritz (adjunct), Mueller, and Rapp; **Associate Professors** Ghosh and Merchant; **Assistant Professors** Buckner and Steward.

GENERAL PREREQUISITES FOR ALL 500-LEVEL COURSES

Prerequisite for all 500-level courses in Math. 151.

**512 U 5**

**Field and Land Surveying**

Sp. 4 cl., 1 3-hr. lab.

Basic plane surveying techniques for geodetic science students.

**515 U G 5****Fundamentals of Geodetic Surveying**

A. 4 cl., 1 3-hr. lab.

Prereq.: 512 or equiv., or permission of instructor.

Principles of establishment and extension of major control; principles of construction and use of angular distance, elevation difference, and gravity measuring devices.

**525 U G 4****Fundamentals of Photogrammetry**

A. 3 cl., 1 3-hr. lab.

Prereq.: Physics 131.

History; major problems in photogrammetry; scope of applications; geometric optics; photography; metric cameras; physical photographic distortions; stereoscopy; comparators; stereoscopic plotters.

**GENERAL PREREQUISITES FOR ALL 600-LEVEL COURSES**

Prerequisites for all 600-level courses include Math. 254 and Physics 131.

**613 U G 5****Introduction to Advanced Geodesy**

Sp. 5 cl.

Prereq.: 515, 646, and 650; or equiv.

Not open for graduate credit to students registering for 658, 776, or 777.

Determination of geodetic reference surfaces by geometric, gravimetric, and celestial methods; establishing horizontal and vertical and three dimensional control.

**624 U G 4****Instrumentation in Photogrammetry**

W. 2 cl., 2 3-hr. lab.

Prereq.: 525 or equiv.

Introduction to instruments used in photogrammetry; single, double, and multi-image types; stereoplotter, comparators, and analytical plotters; evaluation, testing, and adjustment of instruments.

**625 U G 4****Photo Interpretation**

A. 3 cl. 1 3-hr. lab.

Prereq. or concur.: 525 or permission of instructor.

Principles of reading, analysis and interpretation of photographs; application of photographs in geological, forest, agricultural, geographical, etc., interpretations; using the techniques of non-mapping problems.

**626 U G 4****Metric Photography**

A. 3 cl., 1 3-hr. lab.

Prereq.: 525 or equiv.

Properties, design and calibration of various photogrammetric cameras; physical characteristics and quality control of photography; photogrammetric airplanes and auxiliary devices; image evaluation.

**627 U G 5****Introduction to Advanced Photogrammetry**

Sp. 4 cl., 1 3-hr. lab.

Prereq.: 525 and 651; or equiv.

Not open for graduate credit to students registering for 660, 778, 779.

Coordinate transformation in photogrammetry and their differential forms; space resection and orientation, intersection, critical geometry; photogrammetric mapping; photogrammetric surveying; spatial triangulation.

**645 U G 3****Applied Mathematical Methods in Geodetic Science I**

A. 3 cl.

Mathematical techniques used in geodetic science; Taylor series; vector analysis; matrix computations; elements of differential geometry.

**646 U G 3****Applied Mathematical Methods in Geodetic Science II**

W. 3 cl.

Prereq.: 645 or equiv.

Continuation of 645; complex variables, analytic functions; and conformal mapping; use of divided differences; spherical harmonics.

**650 U G 3****Adjustment Computations I**

A. 2 cl., 1 3-hr. lab.

Prereq. or concur.: 645 or equiv.

Classification of errors, measures of dispersion, variance, covariance, propagation of errors, weights, observation, condition and normal equations, examples.

**651 U G 4****Adjustment Computations II**

W. 3 cl., 1 3-hr. lab.

Prereq.: 650 or equiv.

A posteriori variances, representation of residuals, combination of observation and condition equations, generalized minimum variance solution for hybrid measuring systems, statistical tests, empirical fitting of polynomials.

**658 U G 4****Geometric Geodesy**

W. 4 cl.

Prereq.: 650 or equiv.

Historical development; geometry of the reference ellipsoid; reductions and use of ellipsoid as a reference surface; organization of major geodetic control; introduction to advanced geometric geodesy problems.

**660 U G 3****Geometric Photogrammetry**

W. 2 cl., 1 3-hr. lab.

Prereq.: 525 and 645; or equiv.

Interior, exterior orientation; space resection and intersection; coordinate transformations, affine, isogonal, (Helmert), projective (collinearity), direction cosines, gimbal, and their differential forms, critical geometry.

**664 U G 3****Geodetic Astronomy**

W. 3 cl.

Prereq.: 645 or equiv.

Stellar coordinate systems; stellar positions and motions; time; star catalogues; principles of position determination.



**665 U G 2**  
**Observational Geodetic Astronomy**  
 Sp. 1 cl., 1 3-hr. lab.  
 Prereq.: 650 and 664; or equiv.  
 Instrumentation; timekeeping and dissemination; determination of astronomic latitude, longitude, and azimuth.

**666 U G 4**  
**Elements of Cartography and Map Projections**  
 Sp. 3 cl., 1 3-hr. lab.  
 Prereq.: 645 and 658; or concur.: 613; or equiv.  
 Projections of the sphere; the mathematics of the principal map projections used for major map series; cartographic processes and developments.

**686 U G 5**  
**Field Work in Geodesy**  
 Su (1st term). 1 cl., 5 4-hr. labs.  
 Prereq.: 515.

**687 U G 5**  
**Field Work in Geodetic Astronomy**  
 Su (2nd term). 1 cl., 5 4-hr. labs  
 Prereq.: 664.

**688 U G 5**  
**Field Work in Photogrammetry**  
 Su (2nd term), 4 cl., 5 4-hr. labs.  
 Prereq.: 512 and 525.

**693 U G 2-9**  
**Individual Studies in Geodetic Science**  
 Su, A, W, Sp.  
 Prereq.: Permission of instructor.  
 Repeatable to a maximum of 30 cr. hrs.  
 Assigned reading laboratory or field work, under the guidance of a staff member, arranged to meet the requirements of individual students.

**694 U G 2-9**  
**Group Studies in Geodetic Science**  
 Su, A, W, Sp.  
 Prereq.: Permission of instructor.  
 Repeatable to a maximum of 30 cr. hrs.

**760 U G 4**  
**Advanced Geometric Geodesy**  
 A. 4 cl.  
 Prereq.: 658 or equiv.  
 Solution of long line problems on the ellipsoid; datum transformations; determination of the size and shape of the reference ellipsoid; fundamentals of three-dimensional geodesy.

**761 U G 5**  
**Mathematical Projections in Geodesy**  
 Sp. 4 cl., 1 3-hr. lab.  
 Prereq.: 666 or equiv.  
 Use of analytic functions; representation of the ellipsoid on a sphere; geometry of the projected geodesic; Mercator, Transverse Mercator, Oblique Mercator, Conformal Conic projections.

**762 U G 4**  
**Advanced Adjustment Computations**  
 A. 3 cl., 1 3-hr. lab.  
 Prereq.: 651 or equiv.  
 Analyses of mathematic models; systematic errors, correlations, inner adjustment, multivariate statistical analysis; generalized matrices in adjustment.

**763 U G 3**  
**Navigation**  
 Sp. 3 cl.  
 Prereq.: 664 or equiv.  
 Sea, air, and space navigation, analysis of instruments, environmental factors, and geometric aspects.

**776 U G 4**  
**Gravimetric Geodesy**  
 Sp. 4 cl.  
 Prereq.: 646, 651, and 658; or equiv.  
 The gravity and its potential; the disturbing potential and its representation; applications and current methods.

**777 U G 3**  
**Satellite Geodesy**  
 A. 3 cl.  
 Prereq.: 651, 658, and 664; or equiv.  
 Geometric and dynamic applications of artificial satellites in geodesy; determination of station positions and the gravity field of the earth.

**778 U G 5**  
**Analog Photogrammetry**  
 Sp. 4 cl., 1 3-hr. lab.  
 Prereq.: 650 and 660; or equiv.  
 Geometric concepts in models, strips, and blocks, without and with auxiliary information; use of analog photogrammetry in large, medium, and small scale mapping.

**779 U G 4**  
**Computational Photogrammetry**  
 A. 3 cl., 1 3-hr. lab.  
 Prereq.: 651 and 660; or equiv.  
 Correction for refraction, distortion; procedures in resection, orientation, intersection; observations on exterior orientation, on survey coordinates; numerical spatial triangulation; system calibration; error estimates; engineering applications.

**794**  
**Group Studies**  
 Prereq.: Permission of instructor.

**794.01 Non-Conventional Photogrammetry U G 4**  
 A.  
 Studies in strip, panoramic, and weather satellite photography systems; Ranger, Surveyor, and Lunar Orbiter and Mariners systems; electron microscopy and hologrammetry.

**794.02 Advanced Geodetic Astronomy U G 3**  
 A.  
 Prereq.: 664 and 665.  
 Star catalogues and their relationships; time and latitude determinations in observatories; coordinated timekeeping and dissemination; eclipses and occultations; modern astronomical techniques.

**794.03\* Geodetic Applications  
of Digital Computers****U G 4**

W.

Advanced programming techniques; computer developments and use in geodesy, photogrammetry, and cartography.

**802 G 4****Advanced Computational Photogrammetry**

W. 3 cl., 1 3-hr. lab.

Prereq.: 778 and 779; or equiv.

Weight constraints, method of independent bases; functional constraints, surface geometry enforcement; dynamic aerial calibration; close range calibration, application; Reseau photography and specialized comparator techniques.

**805\* G 4****Advanced Stereophotogrammetry**

W. 3 cl., 1 3-hr. lab.

Prereq.: 778 and 779; or equiv.

Differential formulas, parallax formulas; relative and absolute orientation; model errors; quality control in model orientations; critical surface; convergent photography.

**822 G 4****Photogrammetry in Practice**

Sp. 3 cl., 1 3-hr. lab.

Prereq.: 778 and 779; or equiv.

Planning for aerial, terrestrial, and close-range photogrammetry jobs; ground control and signalization; map compilation, efficiency assessment; economic considerations; technical writing; various applications of photogrammetry.

**826\* G 4****Photo-Triangulation**

W. 3 cl., 1 3-hr. lab.

Prereq.: 778 and 779; or equiv.

Spatial photo-triangulation, analogical and analytical; strip and block triangulations; error propagation; use of auxiliary data; independent geodetic control; partial control extension; accuracy and economy considerations

**871\* G 4****Advanced Gravimetric Geodesy**

A. 4 cl.

Prereq.: 776 and 777; or equiv.

Boundary-value problem; use of spherical harmonics; statistical application; appropriate representations; computations in space; combination of gravimetric and satellite data; interpretation of the gravity field.

**872\* G 3****Selenodesy and Lunar Mapping**

W. 3 cl.

Prereq.: 777 or equiv.

Dynamics of the earth-moon system; instrumentation in selenodesy; analysis of the gravity field of the moon; position determination of the moon, lunar mapping.

**873\* G 4****Advanced Satellite Geodesy**

W. 3 cl., 1 3-hr. lab.

Prereq.: 777 or equiv.

Dynamics of earth orbiting satellites; equations of motion and their solutions; advanced data acquisition method; analysis for the gravity field and station positions.

**874†\* G 3****Map Projection Analysis**

A. 3 cl.

Prereq.: 761 or equiv.

Discussion of geodetic and non-geodetic map projections with emphasis on projection characteristics; mathematics of choosing a suitable map projection.

**885 G 2-9****Research Principles and Techniques**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 30 cr. hrs.

**887 G 1-5****Seminar**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 30 cr. hrs.

**994 G 2-9****Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 30 cr. hrs.

**998 G Arr.****Research in Geodetic Science: Thesis**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Research for thesis purposes only.

**999 G Arr.****Research in Geodetic Science: Dissertation**

Su, A, W, Sp.

Research for dissertation purposes only.

## Geography

Office: 156 Hagerty Hall, 1775 College Road

**Professors** Taafe (Chairman), L. Brown, S. E. Brown, Carlson (Emeritus), Casetti, Cox, Demko, Gauthier, Golledge, Hunker, Patten, Randall, Rayner, Smith (Emeritus), and Van Cleef (Emeritus); **Associate Professors** Colombini and Semple; **Assistant Professors** Arnfield and Youngmann; **Instructors** DiMartino (Marion), Herman, Klingensmith (Newark), Osleeb, and Zum Brunnen.

**200 U 5****World Regional Geography**

Su, A, W, Sp. 5 cl.

A comparative study of representative regions of the world; an examination of the cultural, social, economic, and political developments in relation to the geographical conditions.

**220 U 5****Introduction to Physical Geography**

Su, A, W, Sp. 5 cl.

H220 (honors) may be available to students enrolled in a college honors program; others with permission of dept.

The elements and processes of the natural environment, their characteristics, distribution, and implications in the human habitat.

**240 U 5****Economic and Social Geography**

Su, A, W, Sp. 5 cl.

H240 (honors) may be available to students enrolled in a college honors program; others with permission of dept.

Not open to students with credit for 340.

Introduction to geography as a social science; location theory, urban growth processes, spatial diffusion, and behavioral models; their applications to selected regional and urban problems.

**294 U 3-5****Group Studies**

A, W, Sp.

Repeatable to a maximum of 10 cr. hrs.

Students are given the opportunity to pursue special studies not otherwise offered.

**400 U 3****Geography of United States and Canada**

Sp. 3 cl.

Prereq.: Either 200, 220, 240, or equiv.

A geographical analysis of the United States and Canada; the correlation of their natural resources and other environmental factors with their economic and cultural development.

**401 U 3****Geography of Ohio**

Sp. 3 cl.

Prereq.: Either 200, 220, 240, or equiv.

An appraisal of geographic factors in the development of Ohio's natural resources, agriculture, manufacturing, and commerce; historical development of the major economic factors.

**505 U G 4****Geography of Latin America**

A, W, 3 cl.

Prereq.: Either 200, 220, 240, or equiv., or permission of instructor.

Not open to students with credit for 405.

Geographic analysis of Middle and South America emphasizing the interrelationships of the resource base, cultural characteristics, and outside influences upon economic development.

**505.01 Middle America**

A.

Not open to students with credit for 405.01.

**505.02 South America**

W.

Not open to students with credit for 405.02.

**508 U G 4****Geography of Africa**

W. 3 cl.

Prereq.: Either 200, 220, 240, or equiv., or permission of instructor.

Not open to students with credit for 408.

The African environment and the development of culture and economic life; impact of alien culture in Africa; Islamic and western influences in creating geographic regions.

**510 U G 4****Geography of Western Europe**

Sp. 3 cl.

Prereq.: Either 200, 220, 240, or equiv., or permission of instructor.

Not open to students with credit for 410.

Geographic factors in the economic, social, and political progress of the nations of Western Europe; major problems of the area in the light of their geographic background.

**511 U G 4****Geography of Eastern Europe**

W. 3 cl.

Prereq.: Either 200, 220, 240, or equiv., or permission of instructor.

Not open to students with credit for 411.

Resources, their assessment, and development, and related problems in Eastern Europe; the geographic significance of each state to the Communist bloc and to the West.

**512 U G 4****Geography of the Soviet Union**

A. 3 cl.

Prereq.: Either 200, 220, 240, or equiv., or permission of instructor.

Not open to students with credit for 412.

The major regional divisions of the Soviet Union; the resource base in relation to the economic and political aims of the Soviet State.

**515 U G 4****Geography of the Middle East**

Sp. 3 cl.

Prereq.: Either 200, 220, 240, or equiv., or permission of instructor.

Not open to students with credit for 415.

The Middle East and its natural regions in relation to local and international problems; physical and cultural patterns in relation to the current economies.

**516† U G 4****Geography of the Far East**

Sp. 3 cl.

Prereq.: Either 200, 220, 240, or equiv., or permission of instructor.

Not open to students with credit for 416.

The geographic divisions of southern, southeastern, and eastern Asia; the major activities of the people in the regions of densest population and greatest economic importance.

**520 U G 4****Climatology**

A, W. 3 cl.

The elements and the controls of climate; types of climate and their distribution; climates and their effects on the economic and other activities of man.

**530 U G 4****Conservation of Natural Resources**

A, W. 3 cl.

Philosophy of resource use; appraisal of resource base; costs of resource development and conservation; resource perception, utilization and alternatives.

**545 U G 4****Geography of Transportation**

W. 3 cl.

Relation between transportation and spatial organization; selected analytical models dealing with traffic demand, network configuration and allocation of transport facilities; application to selected problems.

**560 U G 4****Political Geography**

A. 3 cl.

Prereq.: Permission of instructor.

Examination of contemporary problems in the political geography of public cost and benefit at international, interregional and urban scales.

**580 U G 4****Elements of Cartography**

A. 2 cl., 2 2-hr. labs.

A study of cartographic techniques of map compilation and presentation including generalization, symbolization, reproduction, and simple computer mapping.

**605† U G 5****Special Problems in the Geography of Latin America**

Sp. 3 cl.

Prereq.: 505 or permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

The analysis of selected topical problems in Latin American geography; typical problem areas are urbanization, industrialization, transportation, agricultural development, and regional development.

**612 U G 5****Special Problems in the Geography of the U.S.S.R.**

Sp. 4 cl.

Prereq.: 512 or permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

Spatial analysis of selected topical problems in Soviet geography.

**620 U G 5****Intermediate Climatology**

W. 4 cl., 1 1-hr. lab.

Prereq.: 520 or equiv. and permission of instructor.

Detailed analysis of atmospheric processes as a basis for the discussion of macro-, meso-, or micro-climates.

**640 U G 5****Location of Manufacturing**

A. 3 cl.

Prereq.: Permission of instructor.

The changing character and concentration of industrial districts; representative industries in relation to labor supply, sources of raw material and power, transportation, and markets.

**642 U G 5****Geography of Development**

W. 3 cl.

Prereq.: Permission of instructor.

Spatial aspects of economic development; spatial analysis of traditional economics, industrial regions, transport linkages and migration patterns in developing countries.

**647 U G 5****Locational Analysis**

W. 3 cl.

Prereq.: Permission of instructor.

Historical review of major location theories and evaluation of application of such theories to geographic problems.

**650 U G 5****Urban Geography**

A, W, Sp. 3 cl.

Prereq.: Permission of instructor.

Origin and growth of cities; structure and function of urban centers, their areal expansion, and intertrade center relations, each examined in relation to city planning.

**660 U G 5****Intermediate Political Geography**

W. 3 cl.

Prereq.: 560 or equiv. and permission of instructor.

Examination of models of spatial organization of political systems and of spatial allocation of social cost and benefit.

**670 U G 5****Population Geography**

W. 3 cl.

Prereq.: 240.

Analysis of population distributions, locational arrangements of growth, densities, and migration flows; spatial relationships between population variables and social, economic, and environmental factors.

**675† U G 5****Cultural Geography**

A. 3 cl.

Prereq.: Permission of instructor.

Examination of cultural factors in organization of space; cultural groups as spatial systems; effects of cultural homogeneity, conflict, and change on spatial interaction.

**Natural Resources Problems, Programs, and Policies**

(See Agr. Econ. 680.)

**681 U G 5****Cartography**

W. 2 cl., 2 2-hr. labs.

Prereq.: 580 or permission of instructor.

The inception, conceptualization, execution, and presentation of thematic statistical maps are studied; emphasis on cartographic design.

**682 U G 3-5****Individual Studies in Cartography**

A, W, Sp. Conf. and lab.

Prereq.: Permission of instructor.

Individual study of cartographic subjects; map compilation, cartographic classification, regionalization, and multi-dimensional representation, computer mapping and real-time computer cartographics.

**693 U G 1-15****Individual Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable with permission of instructor.

Individual study of a special problem or of a particular region.

**694 U G 3-5****Group Studies**

W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Group study of special topics in various fields of geography.

**695 U 5****Undergraduate Seminar in Applied Geography**

Sp. 2 2-hr. cl.

Prereq.: 20 cr. hrs. in Geog.

The practical application of theoretical geographical concepts to problems in the local area.

**Introduction to National Security**

(See Nat. Sec. Pol. S. 702.)

**740 U G 5****Advanced Locational Analysis**

Sp. 2 2-hr. cl.

Prereq.: 647 or permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Discussion of advanced problems in locational and regional analysis; application of programming techniques, the transportation model, spatial equilibrium analysis, multiregional activity analysis, and regional growth models.

**Research Principles and Techniques in National Security**

(See Nat. Sec. Pol. S. 785.)

**800 G 3-5****Seminars in Regional Geography**

Sp. 2 cl.

Repeatable to a maximum of 20 cr. hrs.

Geographical investigation of a selected area; the region under study will be announced.

**Seminar in National Security Research**

(See Nat. Sec. Pol. S. 801.)

**820 G 3-5****Seminars in Physical Geography**

A, W, Sp. 2 cl.

Each decimal subdivision repeatable to a maximum of 20 cr. hrs.

**820.01 Problems in Climatology**

**820.02 Problems in Soils Geography**

**820.03 Special Problems**

**821 G 5****Dynamic Climatology**

W. 2 2-hr. cl.

Prereq.: 620 or permission of instructor.

Dynamics, thermodynamics, energy conservation, flows, conversion processes; large scale circulation patterns with particular emphasis upon turbulence at the synoptic scale; weather processes, and regional climates.

**822 G 5****Microclimatology**

Sp. 2 2-hr. cl.

Prereq.: 620 or permission of instructor.

Radiation and turbulence processes, conduction; variation in wind, temperature, humidity, soil moisture, evaporation, soil temperature; influence of vegetation and artificial structures.

**823† G 5****Applied Climatology**

Sp. 2 2-hr. cl.

Prereq.: 620 or permission of instructor

Effects of climate upon plants and animals (bioclimatology), upon industrial processes and structures, and upon landforms; forecasting; climate modification.

**830 G 3-5****Seminars in Resource Analysis**

A, W, Sp.

Each decimal subdivision repeatable to a maximum of 30 cr. hrs.

The development of theory in resource analysis and its application to selected problems.

**830.01 Theory of Resource Analysis**

**830.02 Problems of Resource Analysis**

**840 G 3-5****Seminars in Economic Geography**

A, W, Sp. 2 cl.

Readings and research in specific aspects of economic geography.

Each decimal subdivision repeatable to a maximum of 20 cr. hrs.

**840.01 Location Theory**

**840.02 Special Topics**

**845 G 3-5****Seminars in Transportation Geography**

A, W, Sp.

Each decimal subdivision repeatable to a maximum of 30 cr. hrs.

The development of theory in transportation geography and its application to selected problems.

**845.01 Theory of Transportation Geography**

**845.02 Problems in Transportation Geography**

### **850 G 3-5**

#### **Seminars in Urban Geography**

A, W, Sp. 2 cl.

The development of theory in urban geography and its application to selected problems.

Each decimal subdivision repeatable to a maximum of 20 cr. hrs.

**850.01 Theory of Urban Geography**

**850.02 Problems in Urban Geography**

### **860 G 3-5**

#### **Seminars in Political Geography**

Sp.

Prereq.: 660 or permission of instructor.

Each decimal subdivision repeatable to a maximum of 30 cr. hrs.

The development of theory in political geography and its application to selected problems.

**860.01 Theory of Political Geography**

**860.02 Problems of Political Geography**

### **870 G 3-5**

#### **Seminars in Population and Social Geography**

A, W, Sp.

Each decimal subdivision repeatable to a maximum of 30 cr. hrs.

The development of theory in population and social geography and its application to selected problems.

**870.01 Theory of Population and Social Geography**

**870.02 Problems in Population and Social Geography**

### **880† G 3-5**

#### **Seminars in Cartography**

Sp.

Repeatable to a maximum of 20 cr. hrs.

Readings and research in cartography.

### **882 G 4**

#### **Development of Geographic Thought**

A. 3 cl.

The evolution of concepts concerning the nature, scope, and methodology of geography; present focus and trends as reflected in current literature.

### **883 G 4**

#### **Application of Quantitative Methods in Geography**

A, W. 2 cl., 2 lab.

Prereq.: Course in introductory statistics and permission of instructor.

Application of quantitative methods to geographic problems; spatial statistics, area sampling, maps of residuals, regionalization methods, and simulation maps.

To be taken in sequence:

**883.01 Applications I**

**883.02 Applications II**

### **885† G 4**

#### **Field Work in Geography**

Sp. 2 cl., Sat. lab.

The practice of field observation and geographic mapping.

### **889 G 3-5**

#### **Seminars in Geography**

A, W, Sp.

Repeatable to a maximum of 20 cr. hrs.

Topics to be announced each quarter.

### **896† G 1-3**

#### **Interdepartmental Seminar in Polar and Alpine Studies**

Sp.

(See under Interdepartmental Seminars.)

### **897 G 1**

#### **Interdepartmental Seminar in Natural Resources**

A, W, Sp.

(See under Interdepartmental Seminars.)

### **899 G 1-5**

#### **Interdepartmental Seminar**

W.

Topics to be announced each quarter.

### **983 G 5**

#### **Special Topics in Quantitative Geography**

A, W, Sp. 1 3-hr. cl.

Prereq.: 883.01 and 883.02.

Repeatable to a maximum of 15 cr. hrs.

Applications of advanced mathematical and statistical models to problems in geographical analysis.

### **998 G Arr.**

#### **Research in Geography: Thesis**

Su, A, W, Sp.

Research for thesis purposes only.

### **999 G Arr.**

#### **Research in Geography: Dissertation**

Su, A, W, Sp.

Research for dissertation purposes only.

## **Geology and Mineralogy**

Office: 107 Mendenhall Laboratory, 125 South Oval Drive

**Professors** Corbato (Chairman), Bates, Bergstrom, Bull, Ehlers, Faure, Foster, Goldthwait, Lamey (Emeritus), La Rocque, McConnell, McLachlan, Moore, Pettyjohn, Schopf, Spieker (Emeritus), Summerson, Sweet, Wenden, and White; **Adjunct Professor** Anderson; **Associate Professors** Grant (Emeritus), Collinson, Elliot, Mayer (Sc.Ed.), Noltimier, Tettenhorst, and Utgard; **Adjunct Associate Professors** Cameron and Gealy; **Assistant Professors** Kendall, McKenzie, and Sutter.

### **100 U 5**

#### **Introduction to Geology**

Su, A, W, Sp. 4 cl., 1-hr lab. arr., 1 half-day field trip.

Not open to students with credit for 101 or 102.

Recommended for nonscience majors.

The materials of the earth's crust, the processes that produce and modify them, and the development of the earth and its life forms through time.

### 101 U 5

#### Physical Geology

A, W, Sp. 4 cl., 1 2-hr. lab., 1 half-day field trip.  
H101 (honors) may be available to students enrolled in a college honors program or by permission of dept.

Recommended first course in Geol. and Mineral. for science majors or those with substantial background in science.

Minerals and rocks and their origin; land forms and how they are produced; structural features of the earth's crust.

### 102 U 5

#### Historical Geology

A, W, Sp. 4 cl., 1 2-hr. lab., 1 half-day field trip.  
H102 (honors) may be available to students enrolled in a college honors program or by permission of dept.

Prereq.: 100 or 101.

Recommended second course in Geol. and Mineral. for science majors or those with substantial background in science.

The history of the earth and its inhabitants through geologic time.

### 103 U 5

#### Geology and the Environment

Sp. 4 cl., 1 2-hr. lab.

Prereq.: 100 or 101.

Application of basic geologic knowledge to problems resulting from man's use of the earth and its resources.

### 194 U 1-5

#### Group Studies

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Group study of special topics in various fields of geology and mineralogy.

### 201 U 5

#### Introduction to Paleontology

Sp. 4 cl., 1 2-hr. lab.

Prereq.: 100 or 101.

An introduction to animal and plant groups significant in the geologic record. Sweet.

### 204 U 5

#### Water Resources

W. 5 cl., 2 1/2-day field trips.

Prereq.: 100 or 101.

Occurrence, movement and behavior of water in the hydrologic cycle with reference to scientific and technological problems relating to water-resources development and conservation. Pettyjohn.

### 206 U 3

#### Oceanography and Marine Geology

A, Sp. 3 cl.

Prereq.: 100 or 101.

Not open to students with credit for 632.

The origin, development, and structure of ocean basins and their contents; contemporary oceanic processes of geologic significance. Anderson.

### 212 U 3

#### The Common Minerals and Rocks

W. 3 2-hr. labs.

Prereq.: 101 and Chem. 121.

Not open to Geol. and Mineral. majors or students with credit for 220, 203, or 223.

A study of the common minerals and rocks, their associations, occurrences, identifying properties, and origin. Moore.

### 214 U 5

#### Principles of Mineralogy

A. 3 cl., 2 2-hr. labs.

Prereq.: Chem. 122, Math. 117 or 150.

Not open to students with credit for 221 or Mineral. 414 or 421.

An introductory course, emphasizing principles and illustrating the internal structure of solids and relationship of structure and chemical composition to properties, applications, and external features. Tettenhorst.

### 221 U 3

#### Elementary Mineralogy and Crystallography

A, W. 3 2-hr. labs.

Prereq.: Chem. 122.

Not open to students with credit for 214 or Mineral. 414 or 421.

Crystal systems, symmetry, common forms and cleavage of crystals; chemical bonding and mineral structures; selected phase diagrams; sight identification of about 80 common minerals using physical and chemical properties. Wenden.

### 222 U 3

#### Elementary Optical Mineralogy

W, Sp. 3 2-hr. labs.

Prereq.: 221 or Mineral. 421.

Not open to students with credit for Mineral. 422.

Elements of optical mineralogy; mineral properties in plane and cross-polarized light; mineral identification in powders and thin-sections; X-ray diffraction in mineral identification and mineral-mixture analysis. Wenden.

### 223 U 5

#### The Common Rocks

A, Sp. 2 cl., 3 2-hr. labs.

Prereq.: 101 and 222.

Not open to students with credit for 202, 203, or 212.

Origin, occurrence, association, and mineral composition of the common rocks; laboratory includes work by megascopic and microscopic methods. Moore.

### 225 U 3

#### Quantitative Methods in Geology

A, Sp. 2 cl., 1 2-hr. lab.

Prereq.: 101; prereq. or concur.: 102 and Math. 151; or permission of instructor.

Not open to students with credit for 205.

Introduction to quantitative methods and techniques, both graphic and mathematical, and their application in the analysis of geologic data.

### 294 U 1-5

#### Group Studies

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Group study of special topics in various fields of geology and mineralogy.

**502 U G 5****Stratigraphy and Paleontology**

A, Sp. 6 days in field in late Su. or just preceding A. or Sp.; 2 2-hr. labs. and field trips in A. or Sp.

Prereq.: 102, 223, 225, and 10 cr. hrs. in Biological Sciences.

Principles of, and procedures in, lithostratigraphy and biostratigraphy, illustrated by field and laboratory studies of sedimentary rocks and fossils. Bates, Bergstrom, Collinson, Kendall, and Sweet.

**530 U G 5****Structural Geology and Geophysics**

W. 4 cl., 1 2-hr. lab.

Prereq.: 225 and Physics 132 or 133.

A study of the principal kinds of geologic structures and their interpretation; an introduction to geophysical exploration of subsurface structures. Moore.

**550 U G 5****Geomorphology**

A, Sp. 4 cl., 1 2-hr. lab., field trips.

Prereq.: 101, 102, and Chem. 122; or permission of instructor.

Detailed study of processes that shape the land surface and the forms produced under diverse climates. White.

**570 U G 1****Senior Thesis**

Su, A, W, Sp.

Prereq.: Sr. standing in Geol. and permission of instructor.

To be taken during the qtr. the student intends to hand in his thesis.

The preparation of a report of professional quality, based on a research project.

**580 U G 5****Field Work in Earth Science**

Sp. Requires full time of student for 5 wks.

Prereq.: 30 qtr. hrs. in Geol. and Mineral., Geog., Astron. or Meteor. with a minimum of 15 qtr. hrs. in Geol. and Mineral.; Ed. 551 and permission of instructor; Geol. and Mineral. 201, 212, and 550 recommended. Not open to Geol. majors.

Essentials of field observation, mapping and data accumulation in the solution of earth-science problems; the work is done in selected off-campus field localities. Mayer, McKenzie, and Utgard.

**581 U G 4****Field Geology I**

Su (1st term). Requires full time of student.

Prereq.: 223, 225, and permission of instructor; 530 recommended.

Concentrated training in the basic essentials of field observation and mapping; the work is done in central Utah, with headquarters in Ephraim. Collinson and Elliot.

**582 U G 6****Field Geology II**

Su (2nd term). Requires full time of student.

Prereq.: 581.

Continuation of 581.

**583 U G 3****Field Geology for Science Teachers**

Sp. 5-day period during recess between W. and Sp.; pre-trip meeting and post-trip report.

Prereq.: 100 or equiv. and permission of instructor.

Intended primarily for in-service teachers.

Not open to Geol. majors.

Application of geological principles in the field; interpretation of earth features observable on a traverse crossing the Appalachian Mountain system. Bates, Mayer, McKenzie, and Utgard.

**594 U G 1-5****Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to maximum of 15 cr. hrs.

Group study of special topics in various fields of geology and mineralogy.

**600 U G 5****Sedimentation and Sedimentary Rocks**

A. 2 2-hr. cl., 1 3-hr. lab.

Prereq.: 502.

Source, dispersal, and accumulation of sediments; the interpretation of the environmental distribution of sedimentary rocks. Summerson.

**601 U G 5****Sedimentary Petrology**

Prereq.: 600 or permission of instructor.

Identification and interpretation of sedimentary rocks based on mineralogic and textural study of thin sections and hand specimens. Kendall.

**601.01 Sedimentary Petrology Sandstones**

W. 3 cl., 2 2-hr. labs.

Not open to students with credit for 601.

**601.02 Sedimentary Petrology of Carbonate Rocks and Shales**

Sp. 3 cl., 2 2-hr. labs.

Not open to students with credit for 601.

**603 U G 5****Stratigraphy**

W. 3 cl., 2 2-hr. labs.

Prereq.: 502.

Advanced study of the principles and procedures of stratigraphic nomenclature, subdivision, correlation, and interpretation, with examples from the international stratigraphic record. Bates, Bergstrom, Collinson, and Sweet.

**614 U G 5****Paleobiology**

A, W. 2 cl., 3 2-hr. labs.

Prereq.: 201 or 502.

Repeatable to a maximum of 10 cr. hrs.

Advanced consideration of the preservation, morphology, development, interrelations, and paleoecologic significance of fossil animals and plants. Bergstrom, La Rocque, Schopf, and Sweet.

**620 U G 5****Introduction to Isotope Geology**

W. 5 cl.

Prereq.: Sr. standing in Geol. or related fields.



Theory of natural isotope abundance variations and applications to problems in the earth sciences. Faure and Sutter.

### 621 U G 5

#### Introduction to Geochemistry

A. 5 cl.

Prereq.: Sr. standing in Geol. or related fields. Chem. 123 or permission of instructor.

Applications of the law of mass action and chemical thermodynamics to mineral equilibria of geological and geochemical interest. Faure.

### 622†\* U G 5

#### Applied Geochemistry

W. 5 cl.

Prereq.: 621.

Geochemical applications to geology including oxidation-reduction reactions, chemical equilibria in the ocean, and geochemical prospecting. Faure.

### 623 U G 5

#### Microscopic Mineralogy

A, W. 2 cl., 3 2-hr. labs.

A. Open only to Geol. & Mineral. graduates;

W. Open only to Cer. E. majors.

Prereq.: 214 or 222, and Physics 112 or equiv.

Not open to students with credit for Mineral. 621.

Theory and use of polarizing microscope; determination of optical constants and identity of minerals. Ehlers.

A. Emphasis on mineral powders.

W. Emphasis on powders and thin-sections of minerals and synthetic products.

### 624†\* U G 3

#### Microscopy of Opaque Minerals

Sp. 3 2-hr. labs.

Prereq.: 623 or equiv.

Not open to students with credit for Mineral. 624.

Application of the petrographic microscope to the study of opaque minerals and ores, their identification, textures, and paragenesis; polished section preparation, etch tests, and micro-chemical tests. Wenden.

### 625 U G 5

#### Igneous Petrology

W. 3 cl., 2 2-hr. labs.

Prereq.: 223 and permission of instructor, or 623.

Not open to students with credit for Mineral. 722.

Petrography, petrogenesis, and occurrence of igneous rocks, with special emphasis on phase equilibria; macroscopic and microscopic examination of igneous and petrographic suites in the laboratory. Ehlers and Elliot.

### 626 U G 5

#### Metamorphic Petrology

Sp. 3 cl., 2 2-hr. labs.

Prereq.: 223 and permission of instructor, or 623.

Petrography, petrogenesis, and occurrence of metamorphic rocks; macroscopic and microscopic examination of metamorphic rocks and selected petrographic suites in the laboratory. Ehlers and Elliot.

### 627† U G 5

#### Thermochemical Mineralogy

A. 5 cl.

Prereq.: Chem. 533 or equiv., or permission of instructor.

Not open to students with credit for Mineral. 605.

Thermal properties of minerals; application of high temperature equilibrium to problems of petrology and technology, using phase diagrams. Foster.

### 628 U G 3

#### Advanced Thermochemical Mineralogy

Sp. 3 cl.

Prereq.: 627.

Not open to students with credit for Mineral. 706.

Derivation and interpretation of phase diagrams of ternary and quaternary systems of importance in petrology and technology. Foster.

### 631\* U G 3

#### Extraterrestrial Mineralogy

W. 3 cl.

Prereq.: 222 or Sr. standing in Geol. and Mineral., Astron., or related fields.

Not open to students with credit for Mineral. 606.

Mineralogy of meteorites, tektites, and lunar-samples as a basis of study of their composition, age, and origin, and those of the earth and solar system. Foster.

### 635 U G 5

#### Advanced Crystallography

A. 3 cl., 2 2-hr. labs.

Prereq.: 214, 221, or equiv.

Not open to students with credit for Mineral. 645.

Principles of crystallography; morphology, structure and habit in crystals; twinning; two-circle goniometer measurement and drawing of crystals; crystallographic calculations; investigations with precession X-ray camera. Wenden.

### 636 U G 3 or 5

#### Advanced Mineralogy

W. 3 cl. or 3 cl., 2 2-hr. labs. (Laboratory optional.)

Prereq.: 214, 221, or equiv.

Not open to students with credit for Mineral. 646 or 665.

Mineral stoichiometry and calculations; application of instrumental methods to mineral identification and the study of mineral suites from selected localities; physical and chemical properties, and paragenesis of minerals on crystal chemical principles. Wenden.

### 637 U G 5

#### X-Ray Powder Diffraction

W. 3 cl., 2 3-hr. labs.

Prereq.: 214 and Math. 153.

Not open to students with credit for Mineral. 650.

Emphasis on diffractometry; evaluation of instrumental, geometrical, and other factors affecting intensity and position of diffraction maxima; qualitative and quantitative analysis, particle size, and other applications. Tettenhorst.

### 638 U G 5

#### X-Ray Crystallography

Sp. 3 cl., 2 3-hr. labs.

Prereq.: 214, 221, or equiv.

Not open to students with credit for Mineral. 654.

Principles of X-ray crystal analysis; phase identification by powder film and diffractometer methods; X-ray fluorescent analysis; particle size determination; unit cell and space group by rotation and Weissenberg methods.

### 639 U G 3

#### Clay Mineralogy

Sp. 3 cl.

Prereq.: 637 or permission of instructor.

Not open to students with credit for Mineral. 730.

Relationship of structures and chemical composition of clay minerals to properties, origin, occurrence, and applications; evaluation of X-ray, diffraction thermal, infrared, and electron microscope data. Tettenhorst.

### 640 U G 5

#### Fundamentals of Geophysics

A. 4 cl., 1 2-hr. lab.

Prereq.: 530.

Analytical treatment of the methods of gravimetry, seismology, terrestrial electricity, terrestrial heat and geomagnetism; the structure, composition and history of the earth. Bull and Noltmeyer.

### 643 U G 3

#### Geophysics Gravimetry

A. 3 cl.

Prereq.: 4th yr. standing in Geol.; or 4th yr. standing in Geod. Sci., Physics, Civil E., and 100 or 101.

Analytical treatment of concepts and methods of gravimetry; introductory theory of the gravitational potential; geological interpretation of gravity data. Bull.

### 645 U G 5

#### Advanced Structural Geology

Sp. 4 cl., 1 2-hr. lab.

Prereq.: 530.

Not open to students with credit for 633.

Rock mechanics, mechanisms of deformation, geotectonics, and structural analysis; solution of structural problems. Sutter.

### 650 U G 5

#### Glacial and Pleistocene Geology

Sp. 5 cl., field trips.

Prereq.: 550.

The features produced by glaciers, present and past, and the history of glaciation during the Pleistocene. Goldthwait.

### 651 U G 5

#### Hydrogeology

Sp. 5 cl., 2 1/2-day field trips.

Prereq.: Senior standing in Geol.; or 4th yr. standing in Engr. and 101; or 101 and 204.

Geologic and hydrologic factors controlling the occurrence and behavior of ground water. Pettyjohn.

### 660 U G 5

#### Geology of Mineral Deposits

W. 4 cl., 1 2-hr. lab.

Prereq.: 223.

##### 660.01\* Geology of Metallic Deposits

The occurrence, origin, distribution, properties, and uses of the metallic minerals. Faure.

##### 660.02\* Geology of Nonmetallic Mineral Deposits

The occurrence, origin, distribution, properties, and uses of the nonmetallic minerals. Bates.

### 661 U G 5

#### Petroleum Geology

W. 3 cl., 2 2-hr. labs.

Prereq.: 502 and 530.

A study of the principles of petroleum geology. Bates.

### 670 U G 5

#### General and Economic Geology of Selected Areas

A. 10-day field trip preceding A. qtr.. Post-trip readings and report.

Prereq.: 502, 530, and 550, or permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Concentrated field study of the stratigraphy, structural geology, tectonics, petrology, and geomorphology of a selected region, with special attention to the economic utilization of earth materials. Bates, Bergstrom, Collinson, Kendall, Summerson, and Sweet.

### 693 U G 1-5

#### Individual Studies

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 45 cr. hrs. in any combination of decimal subdivisions.

Special problems in any branch of geology and mineralogy for which the student has the proper qualifications.

##### 693.01 Economic Geology

##### 693.02 Engineering Geology

##### 693.03 Extraterrestrial Studies

##### 693.04 Field Geology

##### 693.05 Geochemistry

##### 693.06 Geomorphology

##### 693.07 Geophysics

##### 693.08 Glaciology and Glacial Geology

##### 693.09 History of Geology and Mineralogy

##### 693.10 Hydrogeology

##### 693.11 Marine Geology, Limnology, and Oceanography

##### 693.12 Paleontology

##### 693.13 Petrology and Petrography

##### 693.14 Photogeology

##### 693.15 Sedimentation

##### 693.16 Stratigraphy

##### 693.17 Structural Geology

##### 693.18 Earth Science Education

##### 693.19 Unspecified

##### 693.20 Thermochemical Mineralogy

##### 693.21 Crystallochemical Mineralogy

##### 693.22 X-Ray Mineralogy

##### 693.23 Clay Mineralogy

##### 693.24 Physical Properties of Crystals

### 694 U G 1-5

#### Group Studies

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Group study of special topics in various fields of geology and mineralogy.

**800 G 3****Seminar in Stratigraphy**

A, W. 2 2-hr. cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 18 cr. hrs.

Consideration of current and classical problems and procedures in biostratigraphic and lithostratigraphic analysis and synthesis. Bates, Bergstrom, Collinson, Summerson, and Sweet.

**801 G 3****Seminar in Sedimentation and Sedimentary Rocks**

W, Sp. 2 2-hr. cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 18 cr. hrs.

Consideration of sedimentation, and the structures, petrography, depositional environments, and paleologic interpretation of sedimentary rocks. Collinson, Kendall, and Summerson.

**810 G 3****Seminar in Paleobiology**

W, Sp. 2 2-hr. cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 18 cr. hrs.

Advanced topics in paleozoologic and paleobotanic morphology, taxonomy, and procedure; current questions in biostratigraphy, paleoecology, and evolutionary development of fossil floras and faunas. Bergstrom, La Rocque, Schopf, and Sweet.

**821 G 3****Seminar in Isotope Geology and Geochemistry**

Sp. 2 2-hr. cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 18 cr. hrs.

Discussion of selected topics in isotope geology, geochronology, geochemistry, and cosmochemistry. Faure and Sutter.

**822 G 3****Seminar in Petrology and Optical Mineralogy**

A, W. 2 2-hr. cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 18 cr. hrs.

Selected topics in optical mineralogy and igneous, sedimentary, and metamorphic petrology. Ehlers, Elliot, Kendall, and Moore.

**823 G 3****Seminar in Experimental Mineralogy and Petrology**

W, Sp. 2 2-hr. cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 18 cr. hrs.

Selected topics in hydrothermal and high pressure mineralogy and petrology. Ehlers and Foster.

**824 G 3****Seminar in Structural Mineralogy**

A, Sp. 2 2-hr. cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 18 cr. hrs.

Selected topics in advanced mineral structures, clay mineralogy, crystal growth, and crystal physics. McLachlan and Tettenhorst.

**840 G 3****Seminar in Geophysics and Structural Geology**

A, Sp. 2 2-hr. cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 18 cr. hrs.

Selected topics in solid-earth geophysics, glaciology, tectonics, structural analysis, or continental and ocean-basin structure. Bull, Corbato, Moore, Noltemier, and Sutter.

**850 G 3****Seminar in Geomorphology and Quaternary Geology**

A, W. 2 2-hr. cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 18 cr. hrs.

Current and classical problems in geomorphology and Quaternary geology, such as desert and coastal geomorphology, submarine topography, periglacial and karst morphology, volcanology, and Quaternary geochronology. Goldthwait and White.

**851 G 3****Seminar in Hydrogeology and Oceanography**

W. 2 2-hr. cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 18 cr. hrs.

Topics in hydrogeology and oceanography, such as groundwater hydrology and hydraulics, basin management, reef and atoll development, or paleo-oceanography. Anderson, Pettyjohn, and White.

**860 G 3****Seminar in Mineral Deposits and Fossil Fuels**

Sp. 2 2-hr. cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 18 cr. hrs.

Study of selected deposits of metallic minerals, industrial rocks, and minerals, or fossil fuels. Bates, Faure, and Schopf.

**874 G 3****Seminar in the History of Geology and Mineralogy**

Sp. 3 cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 6 cr. hrs.

Discussion of the development of geology and mineralogy, intended to give the student a firm basis for comprehension of the science as it exists today. LaRocque and Wenden.

**896 G 1-3****Interdepartmental Seminar in Polar and Alpine Studies**

Sp.

(See under Interdepartmental Seminars.)

**999 G Arr.****Research in Geology and Mineralogy**

Su, A, W, Sp.

Research for thesis and dissertation purposes only.

## German

Office: 314 Dieter Cunz Hall of Languages, 1841 Millikin Road

**Professors** Hoffman (Chairman), Bekker, Fleischhauer, Seidlin (Emeritus), and Wittkowski; **Associate Professors** Belkin, Gottwald, W. Haas, Miles, Schmidt, and Vitt; **Assistant Professors** Cotter, Edse, Goodman, Gundel, Langguth, Lee, Nelson, Riechel, and Vredevelde; **Instructors** U. Haas, Kuehn, and Petrich.

### PLACEMENT AND PROFICIENCY EXAMINATIONS

Students with two years of high school German register for German 103; however, in order to insure proper registration, placement tests are required of all students who continue their study of German in the department after beginning their language in high school. Such tests are given on the first day of instruction in each quarter. Consult the Humanities section of the Colleges of the Arts and Sciences catalog.

Students who are given advanced standing in the department as a result of the placement and proficiency examination become eligible for University credit.

### EXCESS ENTRANCE CREDITS IN GERMAN

Freshmen who have excess credits in foreign language are eligible for examination for advanced standing. The examination is given at the same time as the placement tests mentioned above.

### 101 U 5 Elementary German

Su, A, W, Sp. 5 cl.

### 102 U 5 Elementary German

Su, A, W, Sp. 5 cl.

Prereq.: 101 or equiv.

### 103 U 5 Intermediate German

Su, A, W, Sp. 5 cl.

Prereq.: 102 or 110 or equiv.

Reading; oral and written practice; grammar review; students may select from among the following subdivisions which emphasize specific skills and subject matter.

#### 103.01 Basic

Not open to students with credit for 103.

Balanced use of the basic language skills: reading, aural comprehension, speaking, and writing.

#### 103.02 Conversation

Not open to students with credit for 103.

Emphasis on speaking and aural comprehension.

#### 103.03 Humanities and Civilization

Not open to students with credit for 103.

Emphasis on reading in the humanities and in German culture and civilization.

#### 103.04 Literature

Not open to students with credit for 103.

Emphasis on the reading of German literary texts.

#### 103.05 Science

Not open to students with credit for 103 or 113.

Introductory readings in scientific German.

### 104 U 5 Intermediate German

Su, A, W, Sp. 5 cl.

Prereq.: 103 or 112 or 113.

Reading; oral and written practice; vocabulary building; students may select from among the following subdivisions which emphasize specific skills and subject matter.

#### 104.01 Basic

Not open to students with credit for 104.

Balanced use of the basic language skills: reading, aural comprehension, speaking, and writing.

#### 104.02 Conversation

Not open to students with credit for 104.

Emphasis on speaking and aural comprehension.

#### 104.03 Humanities and Civilization

Not open to students with credit for 104.

Emphasis on reading in the humanities and in German culture and civilization.

#### 104.04 Literature

Not open to students with credit for 104.

Emphasis on the reading of German literary texts and topics.

#### 104.05 Science

Not open to students with credit for 104 or 114.

Advanced readings in scientific German.

### 109 U 3 Elementary German Conversation

Su, A, W, Sp. 3 cl.

Prereq.: 102 or 110; also open to students with grade of A in 101. No audit.

### 110 U 5, 10 Intensive Elementary German

A, W, Sp. 10 cl.

Prereq.: Permission of dept.

Not open to students with credit for 102. Students with credit for 101 or the equiv. may not register for more than 5 cr. hrs.

Elementary German for students who wish to acquire the basic language skills in one quarter; equivalent to 101 and 102.

### 112 U 5, 10, 15 Intensive German

Su. Enrollment limited to 20 students.

Prereq.: Permission of dept.

Full time of student and full fees required.

Students with credit for 101 or the equiv. may not register for more than 10 cr. hrs. Students with credit for 101 and 102 or the equiv. may not register for more than 5 cr. hrs. Students with credit for 103 or the equiv. may not register for credit. Register before May 11. No audit.

Elementary and intermediate German for students desiring comprehensive knowledge of German in the shortest possible time; students will devote their entire time to this course.

### 162 U 5 Elementary-Intermediate German for Selected Students

W. 5 cl.

Prereq.: Grade of A in 101.

Not open to students with credit for 117.

**163 U 5****Elementary-Intermediate German for Selected Students**

Sp. 5 cl.

Prereq.: 162.

Not open to students with credit for 118.

Successful completion of the sequence 101-162-163 fulfills language requirements and provides eligibility for 200-level courses.

Continuation of 162.

**203 U 3****Intermediate German Conversation**

A, W, Sp. 3 cl.

Prereq.: 104.02, any other 104 course and 109 with a minimum grade of C, or permission of instructor. 203 may be taken concur. with 204. No audit.

Practice in spoken everyday idiomatic German, based on texts concerning German life today.

**204 U 2****German Composition I**

A, W, Sp. 2 cl.

Prereq.: 104.02, any other 104 course and 109 with a minimum grade of C, or permission of instructor. 204 may be taken concur. with 203. No audit.

Practice in simple writing with some conversation.

**205 U 2****German Composition II**

W, Sp. 2 cl.

Prereq.: 204.

Themes, reports, and translations of difficult texts.

**221 U 5****Introduction to German Literature: The 20th Century**

A, W, Sp. 5 cl.

Prereq.: Either 104, 163, or equiv.

Students are advised to register also for 203 and 204.

Not open to students with credit for 227.

Readings from representative authors such as Mann, Schnitzler, Duerrenmatt.

**222 U 5****Introduction to German Literature: The 19th Century**

A, W, Sp. 5 cl.

Prereq.: Either 104, 163, or equiv.

Students are advised to register also for 203 or 204.

Not open to students with credit for 226.

Readings from Brentano, Hoffmann, Storm, and Keller.

**223 U 5****Introduction to German Literature: The Classical Period**

W, Sp. 5 cl.

Prereq.: Either 221, 222, or equiv.

Students are advised to register also for 203 and 204.

Not open to students with credit for 225.

Readings from Goethe and Schiller.

**260 U 3****Early German Literature in Translation**

A. 3 cl.

Credit does not apply toward a major in German.

Trends in German literature of the Middle Ages, the Renaissance and the Reformation as reflected in representative literary monuments. Bekker.

**261 U 3****German Classics in Translation**

W. 3 cl.

Credit does not apply toward a major in German.

Social and intellectual forces in Germany as reflected in German literature from the Enlightenment to the middle of the 19th century; masterpieces from Goethe to Gottfried Keller.

**262 U 3****Modern German Literature in Translation**

Sp. 3 cl.

Credit does not apply toward a major in German.

Intellectual forces and literary trends in German literature from the end of the 19th century to the present; masterpieces from Gerhart Hauptmann to Bertolt Brecht.

**361\* U 3****German Civilization I**

A. 3 cl.

Taught in Engl.

The cultural heritage of the German people from the beginning to about 1500; institutions, phases of civilization, interrelationship of social and literary history. Haas.

**362\* U 3****German Civilization II**

W. 3 cl.

Taught in Engl.

German civilization from Luther to the Age of Goethe; cultural trends, social changes, historical development to the end of the Holy Roman Empire.

**409 U 3****Advanced German Conversation**

W. 3 cl.

Prereq.: 203.

**410 U 3****Advanced German Composition**

A. 3 cl.

Prereq.: 203 and 205 or permission of instructor.

Not open to students with credit for 630.

Writing and discussion of compositions, practical review of grammar in context, and practice in translation.

**463\* U 3****German Civilization III**

Sp. 3 cl.

Prereq.: 10 cr. hrs. in 200-level courses in German with the exception of 260, 261, and 262.

Taught in German.

Intellectual, artistic, and social trends in the German speaking countries from 1815 to the present. Haas.

**571 G 5****Basic German for Graduate Students**

Su, A, W, Sp. 5 cl.

Prereq.: Grad. standing.

Credit does not apply to the minimum hours required for the Master's or doctoral degrees. No audit.

The fundamentals of German grammar, as required for the reading of German texts in the sciences and humanities.

**572 G 3****German for Research I**

Su, A, W, Sp. 3 cl.

Prereq.: Grade of C or above in 571 or equiv. preparation demonstrated by a placement test.

Open only to graduate students. Credit does not apply to the minimum hours required for the Master's or doctoral degrees. No audit.

Repeatable twice.

Satisfactory completion of this course (grade of A or B) may be accepted by the student's dept. as evidence of a dictionary reading knowledge in fulfillment of Ph.D. language requirement.

**573 G 3****German for Research II**

Su, W, Sp. 3 cl.

Prereq.: Grade of A or B in 572, or equiv. preparation demonstrated by a placement test and permission of instructor.

Open only to graduate students. Credit does not apply to the minimum hours required for the Master's or doctoral degrees. No audit.

Repeatable twice.

Reading of difficult material at a reasonable rate of speed and with only infrequent use of dictionaries. Completion of this course with a grade of A or B may be accepted by the student's dept. as evidence of a thorough reading knowledge of German.

GENERAL PREREQUISITES FOR COURSES  
NUMBERED 593, 594, AND ALL 600-LEVEL COURSES  
Unless otherwise indicated, the prerequisites for 593, 594, and all 600-level courses are: a minimum of 10 hours of 221, 222, 223, plus a minimum of 5 hours of 203, 204, 205, 409, 410. Exceptions may be allowed by instructors for students with special qualifications.

**593 U 2-5****Individual Studies**

Su, A, W, Sp.

Prereq.: Permission of chairman.

Repeatable to a maximum of 10 cr. hrs.

Individual investigation of minor problems in German language and literature.

**594† U 2-5****Group Studies**

Su, A, W, Sp.

Prereq.: Permission of chairman.

Repeatable to a maximum of 10 cr. hrs.

Investigation of minor problems in German literature and language.

**605†\* U G 3****Introduction to the Study of Language**

Sp. 3 cl.

Elements of linguistics with emphasis on the historical study of languages and on semantics; the position of Germanic in the Indo-European family of languages.

**606 U G 3****Introduction to the Historical Study of German**

Sp. 3 cl.

The historical development of the German language, with a short survey of the Germanic languages; internal and external influences which have determined its characteristics (phonology, morphology, and vocabulary). Belkin.

**611 U G 3****Medieval German Literature**

A. 3 cl.

Survey of German literature from the 8th century to the end of the Middle Ages.

**612 U G 3****Literature of Humanism, Reformation, and Baroque**

W. 3 cl.

Survey of German literature from 1400 to 1700. Bekker.

**621 U G 3****The German "Novelle"**

A. 3 cl.

Reading and analysis of masterpieces of the 19th and 20th centuries: Kleist, Eichendorff, Stifter, Keller, and Thomas Mann.

**622 U G 3****The German Drama**

W. 3 cl.

Reading and analysis of masterpieces of the 19th and 20th centuries: Schiller, Kleist, Grillparzer, Hebbel, and Brecht. Wittkowski.

**623 U G 3****German Lyrics**

Sp. 3 cl.

Analysis of German lyrics from 1200 to the present; study of specific forms: Volkslied, ballad, sonnet, and individual great lyricists. Hoffmann.

**630 U G 3****Introduction to Stylistics**

W, Sp. 3 cl.

Prereq.: 205 or 410 or permission of instructor.

Composition on assigned topics, intensive translation, and comparative study of usage designed to develop a sophisticated expository style in the writing of German. Gottwald and Haas.

**635 U G 3****Practical German Pronunciation**

Sp. 2 2-hr. cl.

Prereq.: Permission of instructor.

Standard German pronunciation; oral and written drill. Fleischhauer.

**650 U G 1 or 3****Proseminar**

Su, Sp. 3 cl., 3 cr. hrs.

Su (1st term). 3 cl., 1 cr. hr.

Prereq.: Permission of chairman.

Repeatable to a maximum of 24 cr. hrs.

**660† U G 3****Masterpieces of German Literature**

Su. 3 cl.

Prereq.: Permission of chairman.

Repeatable to a maximum of 18 cr. hrs.

Selections from works of major German writers; topic varies each year.

**693 U G 2-5****Individual Studies**

Su, A, W, Sp.

Prereq.: Permission of chairman.

Repeatable to a maximum of 30 cr. hrs.

Investigation of minor problems in the various fields of German literature and philology. Bekker, Belkin, Fleischhauer, Miles, Schmidt, Vitt, and Wittkowski.

**694†\* U G 2-15****Group Studies**

Sp.

Prereq.: Permission of chairman.

Repeatable to a maximum of 30 cr. hrs.

Investigation of minor problems in the various fields of German literature and philology.

**698 U G 15****Study Tour of Germany**

Sp.

Prereq.: Minimum of 25 cr. hrs. in German or equiv., and permission of department chairman.

The first five weeks will be devoted to intensive study on this university campus; the remainder of the course will be spent in travel in Germany; in Germany only German will be spoken and formal instruction will be given daily by the tour leader.

**GENERAL PREREQUISITES FOR COURSES  
NUMBERED 700**

Prerequisites for 700-level courses are graduate standing, or 4th yr. standing with 9 cr. hrs. in German at the 600-level, and permission of chairman.

**700 U G 3****College Teaching of German**

A. 2 cl.

Methods and techniques for teaching German at the college level.

**721†\* U G 4****German Literature of the 18th Century**

A. 4 cl.

The literature of the Enlightenment and Storm and Stress; Lessing, Klopstock, Wieland.

**722†\* U G 4****German Classical Literature****722.01\* Goethe and Schiller I**

W. 4 cl.

Young Goethe and Schiller; their development and early works.

**722.02\* Goethe and Schiller II**

Sp. 4 cl.

Goethe's and Schiller's major later works and their significance for modern times.

**723\* U G 3****Goethe's Faust**

Sp. 3 cl.

History of the Faust legend from the 16th century to Goethe; reading and discussion of the play. Wittkowski.

**724\* U G 4****German Romanticism**

A. 4 cl.

The romantic revolt against the ideas of classicism. Novalis, the Schlegels, Tieck, Kleist, Eichendorff, and E. T. A. Hoffmann. Vitt.

**725\* U G 4****German Literature of the 19th Century**

W. 4 cl.

Literary forces and trends from Goethe's death to the founding of the German Reich (Grillparzer, Buechner, Hebbel, Raimund, Moerike, Stifter, Keller, and Meyer). Wittkowski.

**726\* U G 4****Modern German Literature**

Sp. 4 cl.

Main currents of German thought and literature from Nietzsche to the present; Hauptmann, Schnitzler, Mann, Rilke, George, Hofmannsthal, Kafka, and Brecht.

**730 U G 3****Advanced Stylistics**

W. 3 cl.

Prereq.: Grade of A in 630, or permission of instructor.

Stylistic analysis on an advanced level of German prose; compositions, reports, and discussion. Vitt.

**777 U G 2-5****Colloquium in German Literature**

Su, A, W, Sp. Arr.

Prereq.: Permission of Chairman.

Repeatable to a maximum of 30 cr. hrs.

Selected topics, problems, and works in the various fields of German literature.

**H783 U 3-5****Honors Course**

W, Sp. 2 1½-hr. cl.

Prereq.: 4th yr. standing with a grade of A in at least half of the German courses and an average of B in the remainder; permission of instructor under whose supervision the work is to be completed and the Arts and Sciences Honors Committee.

Repeatable to a maximum of 15 cr. hrs.

Offers undergraduates with special aptitudes a greater opportunity to do independent study than is possible in the ordinary course.

**GENERAL PREREQUISITES FOR COURSES  
NUMBERED 800**

Prerequisites for 800-level courses are graduate standing and permission of chairman.

**800 G 3****Bibliography and Method**

A. 2 cl.

Required of all candidates for grad. degrees.

The tools, problems, and methods of literary research. Schmidt.

801 G 4

**Middle High German**

A. 4 cl.

Middle High German texts; methods of textual criticism. Fleischhauer.

802\* G 4

**Old Saxon and Old High German**

W. 4 cl.

Readings from the Heliand and selected Old High German texts. Fleischhauer.

803\* G 3

**Gothic**

Sp. 3 cl.

Readings from the Bible; Gothic as a basis for the comparative study of the Germanic languages and historical German phonology and morphology. Fleischhauer.

806†\* G 3

**History of the German Language**

W. 3 cl.

Prereq.: 801.

Basic concepts of historical linguistics; the major factors of change in the history of German from Proto-Germanic to the present. Fleischhauer.

821† G 3

**History of German Literature Until 1700**

A. 3 cl.

Readings from the earliest period to the end of the 17th century. Belkin.

822†\* G 3

**History of German Literature Until 1700**

W. 3 cl.

Continuation of 821. Bekker.

823† G 3

**History of German Literature Until 1700**

Sp. 3 cl.

Continuation of 822. Bekker.

860 G 5

**Seminar in German Literature**

Su, A, W, Sp. 2 cl.

Selected topics from German Literature after 1500; problems of methods and interpretation.

870 G 3

**Seminar in German Linguistics**

A, W. 2 cl.

Selected topics from medieval literature, word history, stylistics, and psychology of language.

**Medieval and Renaissance Culture**

(See Medieval and Renaissance Studies 888.)

**Medieval and Renaissance Literature**

(See Medieval and Renaissance Studies 889.)

993 G 1-5

**Individual Studies**

Su, A, W, Sp.

Prereq.: Permission of Chairman.

Repeatable to a maximum of 15 cr. hrs.

With the approval of department chairman, doctoral students may register for individual study in areas normally not covered by courses. Bekker, Belkin, Fleischhauer, Miles, Schmidt, Vitt, and Wittkowski.

998 G Arr.

**Research in German: Thesis**

Su, A, W, Sp.

Repeatable to a maximum of 20 cr. hrs.

Research for Master's thesis.

999 G Arr.

**Research in German: Dissertation**

Su, A, W, Sp.

Research for dissertation purposes only.

Bekker, Belkin, Fleischhauer, Hoffmann, Miles, Schmidt, Vitt, and Wittkowski.

## Graduate School Course

801 G 2

**College Teaching**

W, Sp. 2 cl.

Designed to acquaint prospective college teachers with the major problems involved in college teaching.

## Greek

Office: 217 Derby Hall, 154 North Oval Drive

**Professors** Morford (Chairman), Abbott, Babcock, Forbes (Emeritus), and Lenardon; **Associate Professors** Davis, Hahm, and Schlam; **Assistant Professors** Kratz, Shumaker, Snyder, Sweet, and Tracy; **Adjunct Assistant Professor** Drachman.

See Classics also.

101 U 5

**Elementary Greek**

A. 5 cl.

Snyder and Tracy.

102 U 5

**Elementary Greek**

W. 5 cl.

Prereq.: 101.

Snyder and Tracy.



**103 U 5**  
**Intermediate Greek Reading**

Sp. 5 cl.  
 Prereq.: 102.  
 Shumaker.

**112 U 5, 10, 15**  
**Intensive Introduction to Greek**

Su, W. 10 cl. and 10 or more hrs. of supervised study.  
 Full time of student and full fees required.  
 Equiv. of 101, 102 and 103. Students with credit for 101 or the equiv. may not register for more than 10 cr. hrs. Students with credit for 101 and 102 or the equiv. may not register for more than 5 cr. hrs. Students with credit for 103 or the equiv. may not register for credit.

**221 U 5**  
**Attic Prose**

A. 5 cl.  
 Prereq.: 103 or 112.  
 Babcock.

**222 U 3**  
**Euripides**

W. 3 cl.  
 Prereq.: 210 or 221.  
 Not open to students with credit for 202.  
 Schlam.

**823†\* G 3**  
**Homer**

Sp. 3 cl.  
 Prereq.: 210 or 221.  
 Not open to students with credit for 200.  
 Kratz.

**604 U G 3**  
**Herodotus**

W. 3 cl.  
 Prereq.: 2 courses at 200 level.  
 Not open to students with credit for 201 except by permission of chairman.  
 Tracy.

**606 U G 3**  
**Sophocles**

Sp. 3 cl.  
 Prereq.: 2 courses at 200 level.  
 Morford.

**609 U G 3**  
**Plato**

A. 3 cl.  
 Prereq.: 2 courses at 200 level.  
 Sweet.

**612† U G 3**  
**Greek Prose Composition**

W.  
 Prereq.: At least 1 course at 600 level.  
 Hahn.

**645† U G 3**  
**Koine to Modern Greek**

Sp.  
 Prereq.: 2 courses at 200 level.  
 Historical survey of the post-classical development of the Greek language, with representative texts from different periods.

**693 U G 1-6**  
**Individual Studies**

Su, A, W, Sp.  
 Prereq.: 2 courses at 600 level, or permission of instructor.  
 Repeatable to a maximum of 15 cr. hrs.  
 Passages for reading and topics for investigation will be selected to meet the needs of individual students.

**694 U G 1-6**  
**Group Studies**

W.  
 Prereq.: 4 courses more advanced than 104, or permission of chairman.  
 Repeatable to a maximum of 20 cr. hrs.

**GENERAL PREREQUISITES FOR COURSES  
 NUMBERED 800 AND ABOVE**

Prerequisites for admission to courses numbered 800 and above are graduate standing and permission of the Chairman.

**800†\* G 3**  
**Proseminar**

A.  
 Required of all graduate students. Students may not receive credit for both Latin 800 and Greek 800.  
 An introduction to the materials and methods of research; the history of classical scholarship; individual assignments in bibliographical problems.  
 Abbott.

**803† G 4**  
**Sophocles**

Su.

**805† G 4**  
**Lyric Poetry**

W.

**807† G 4**  
**Euripides**

W.

**810† G 3**  
**Structure of the Greek Language**

A. 3 cl.  
 Drachman.

**811† G 4**  
**Greek Dialects**

A.  
 Drachman.

**813† G 4**  
**Demosthenes**

Sp.

815† G 4

**Aristophanes**

W.

818† G 4

**Thucydides**

Sp.

Lenardon.

831 G 4

**Homer and the Homeric Language**

A.

832† G 4

**Hesiod**

A.

Lenardon.

833† G 4

**Pindar**

Sp.

Shumaker.

834† G 4

**Aeschylus**

Sp.

Lenardon.

835 G 4

**Aristotle**

Sp.

Hahm.

836 G 4

**Hellenistic Poetry**

W.

Shumaker.

850† G 4

**History of Greek Literature**

A.

Lectures and assigned reading on the development of Greek literature; required and suggested passages for translation in each author studied.

851† G 4

**History of Greek Literature**

W.

Continuation of 850.

852† G 4

**History of Greek Literature**

Sp.

Continuation of 851. Shumaker.

860† G 3

**Greek Palaeography**

W. 3 cl.

Prereq.: Advanced reading ability in Greek and permission of instructor.

861† G 3

**Textual Criticism**

Sp. 3 cl.

Prereq.: 860.

**Medieval and Renaissance Culture**

(See Medieval and Renaissance Studies 888.)

**Medieval and Renaissance Literature**

(See Medieval and Renaissance Studies 889.)

993 G 1-4

**Individual Studies**

Su, A, W, Sp.

Repeatable to a maximum of 20 cr. hrs.

Assigned readings; individual research in disciplines such as epigraphy, topography, papyrology, linguistics, etc.

994† G 1-6

**Group Studies**

Su, W.

Repeatable to a maximum of 20 cr. hrs.

995 G 5

**Seminar**

A.

Repeatable to a maximum of 20 cr. hrs.

Credit in this course will be granted only with the completion of 996.

The seminar will normally consist of a two-term sequence (A-W, W-Sp); an intensive study of an author or a genre, e.g., Aeschylus, Thucydides, Hellenistic poetry.

996 G 5

**Seminar**

W.

Prereq.: 995.

Repeatable to a maximum of 20 cr. hrs.

Continuation of 995.

999 G Arr.

**Research**

Su, A, W, Sp.

Research for thesis and dissertation purposes only.

## Health Education

Lewis A. Hess, Director of School  
Office: 215 Pomerene Hall, 1760 Neil Avenue

**Professors** Cushman (Chairman), Beyrer, and Kaplan;  
**Assistant Professors** Beetham and Grosshans, Meeks  
and Windsor; **Instructors** Downey, Johnson, and Vitello.

101 U 1

**Hygiene**

A, W, Sp. 1 cl., 1 lab. hr.

Elective for all freshmen except those who take 103 or 200.

Not open to majors or minors in Phys. Ed., and Dent. Hyg. Ed.

Designed to influence knowledge, attitudes, and behavior related to individual health.

**102 U 2****First Aid**

Su, A, W, Sp. 2 cl., lab.

A consideration of first aid practices to the injured; completion leads to Red Cross certificates in first aid.

**103 U 3****Health for the College Student**

A, W, Sp. 3 cl.

Not open to students with credit for 101 or 200.

A study of student health problems; designed to foster understandings and attitudes needed for intelligent decision-making related to present and future health needs.

**200 U 5****Hygiene**

Su, A, W, Sp. 5 cl.

Not open to students with credit for 103.

Open only to students in Dent. Hyg. Ed., Health Ed., and Pub. Recreation curricula, or by permission of instructor.

Designed to establish a basis for positive health and efficiency through a consideration of various conditions and factors which affect health.

**201 U 3****Current Concepts in Community Health**

W, Sp. 3 cl.

A study of community health programs, the need for them, the problems and issues involved, and how these problems can be solved.

**289 U 2-5****Field Experience**

A, W, Sp.

For students in Health Education curriculum.

Repeatable to a maximum of 5 cr. hrs.

Professional service with children or youth in some school or community agency.

**300 U 3****Health Education for Elementary Teachers**

Su, A, W, Sp. 3 cl.

Prereq.: 101 or equiv., and Psychol. 230.

Not open to undergraduate minors or majors in Phys. Ed., or Health Ed.

The teacher's responsibility for health of school child; screening, referral, vision and hearing, nutritional problems, instructional programs, emergency care, teacher's health.

**301 U 3****Health Education for Secondary Teachers**

Su, A, W, Sp. 3 cl.

Prereq.: 101 or equiv., and Psych. 230.

Not open to students preparing for secondary school teaching of Health Ed. or Phys. Ed.

A study of health problems as they relate to the individual secondary school students; emphasis on the role of the teacher in the secondary school health program.

**402 U 3****Safety Education**

W, Sp. 3 cl.

Prereq.: 102 and permission of instructor.

The study of epidemiology of accidents, development of preventive programs and safety consciousness; the teaching of first aid to meet Red Cross instructor's certification. Windsor.

**501 U 3****The School Health Program**

A, W, Sp. 3 cl.

Prereq.: 200.

For physical education students not in Health Education major or minor.

A consideration of the total school health program, including healthful school living, health services, and the teaching of health.

**587 U 3-15****Student Teaching in Secondary Schools**

A, W, Sp.

Prereq.: 4th yr. standing.

A minimum of 15 cr. hrs. is required.

For additional information, see College of Education catalog.

Observation, participation, and responsible teaching in a public school in the Greater Columbus area; individual and group conferences or seminars.

**602 U G 3****Personal Health Problems**

Su, A, W. 3 cl.

An advanced course in personal health problems; extensive reading and reporting in selected health areas. Cushman and Beyrer.

**603 U G 2****Current Progress in Disease Control**

Sp. 2 cl.

Prereq.: 4th yr. grad. standing in a health science area.

Authorities in medicine and health sciences will interpret how current findings may affect disease prevention and control; newer knowledge of cancer, dental caries, etc., will be discussed. Cushman and Beetham.

**604 U G 3****Education for Human Sexuality**

Su, W, Sp. 3 cl.

Prereq.: 200, 622 or equiv., Sociol. 330, and permission of instructor.

Review of current information on health and sexuality by educators and school personnel; consideration of the sex education curriculum, teaching methods, materials, and controversial issues. Kaplan.

**621 U G 3****School Health Services**

Su, A, W, Sp. 3 cl.

Prereq.: 200 or equiv.

Consideration of healthful school living and health services, including health appraisal, counseling, educational adjustments, communicable diseases, and emergency programs. Cushman.

**622 U G 5****The Teaching of Health**

Su, W, Sp. 5 cl.

Prereq.: 621.

Not open to students with credit for 610.

Principles, methods, materials, and resources involved in teaching health; direct, correlated, and integrated curriculum patterns; individual teaching experience. Cushman, Beyrer, and Kaplan.

**623 U G 3**  
**Organizational Relationships**  
**in School Health Education**

Su, A, W, Sp. 3 cl.

Prereq.: 622.

Not open to students with credit for 620.

The relation of the school health program to the total community health program; official and non-official health agencies are studied. Beyrer.

**690 U G 4**  
**School Health Education Workshop**

Su. 3 wk. workshop.

Prereq.: Permission of instructor.

Repeatable to a maximum of 8 cr. hrs.

A team approach to school health education with emphasis on instruction, health services, environment, methods, materials, resources, evaluation, interrelationships, etc.; individual and group study. Beetham.

**693 U G 1-4**  
**Individual Studies**

Su, A, W, Sp.

Prereq.: 4th yr. or grad. standing and permission of adviser.

Investigation of selected professional problems.

**701 U G 3**  
**Comparative Study of World Health Problems**

W. 3 cl.

Prereq.: 103, or equiv.

A study of world health problems, their influences on all people, the variety and magnitude of problems, and the methods being used to solve them. Kaplan.

**994 G 3**  
**Group Studies in School Health Education**

A, W, Sp.

Advanced problems in school health education; individual or group participation.

**994.01 Curriculum in Health Education**

A.

Beyrer.

**994.02 Survey of Research in Health Education**

W.

Beyrer.

**994.03 Evaluation in Health Education**

Sp.

Windsor.

**995 G 2**  
**Seminar in School Health Education**

A. 2 cl.

Beyrer and Cushman.

**999 G Arr.**  
**Research**

Su, A, W, Sp.

Research for thesis and dissertation purposes only.

## Hebrew

Office: 248 Dieter Cunz Hall of Languages, 1841 Millikin Road

Professor Griffin (Chairman); Associate Professor Hayon; Assistant Professor Mashiah.

**101 U 5**  
**Elementary Hebrew**

A, W, Sp. 5 cl.

Conversation, reading, writing, vocabulary building, phonetics, and grammar.

**102 U 5**  
**Elementary Hebrew**

A, W, Sp. 5 cl.

Prereq.: 101.

Reading of modified passages from modern Hebrew literature supplemented with additional study of grammar.

**103 U 5**  
**Intermediate Hebrew**

A, W, Sp. 5 cl.

Prereq.: 102 or 110.

Reading of passages from various periods of Hebrew literature; review of salient points of elementary grammar and introduction to elements of classical Hebrew.

**104 U 5**  
**Intermediate Hebrew**

A, W, Sp. 5 cl.

Prereq.: 103.

Reading of modern Hebrew short stories, poems, and essays; special emphasis on oral practice and Hebrew idioms.

**110 U 5, 10**  
**Intensive Elementary Hebrew**

A, Sp. 10 cl.

Prereq.: Permission of dept.

Not open to students with credit for 102. Students with credit for 101 or equiv. may not register for more than 5 cr. hrs.

Elementary Hebrew for students wishing to acquire the basic language skills in one quarter; intensive drill in form, syntax, vocabulary, and idiom; equivalent to 101 and 102.

**112 U 5, 10, 15**  
**Intensive Modern Hebrew**

Su. 15 cl. Enrollment limited to 25 students.

Prereq.: Permission of chairman.

Full time of student and full fees required.

Equiv. of 101, 102, 103. Students with credit for 101 or the equiv. may not register for more than 10 hrs.

Students with credit for 101 and 102 or the equiv. may not register for more than 5 hrs. Students with credit for 103 or the equiv. may not register for credit.

**193 U 1-15**  
**Individual Studies**

Su, A, W, Sp.

Prereq.: Permission of dept.

Repeatable to a maximum of 30 cr. hrs.

194 U 1-15

**Group Studies**

Su, A, W, Sp.

Prereq.: Permission of dept.

Repeatable to a maximum of 30 cr. hrs.

241 U 3

**The Culture of Contemporary Israel**

W, Sp. 3 cl.

Survey and analysis of the socio-cultural phenomena and problems in modern day Israel; taught in English. Hayon.

271 U 3

**Introduction to Modern Hebrew Literature in English**

A, W, Sp. 3 cl.

Prereq.: Engl. 100 or equiv.

Modern Hebrew literature: works of major writers from the middle of the 18th century to the present; emphasis on European literary influences. Mashiah.

272 U 3

**Hebrew Literature in English Translation: Ancient and Medieval Times**

A. 3 cl.

Prereq.: Engl. 100 or equiv.

Hebrew literature from its beginnings to the middle of the 18th century. Lesley.

401 U 5

**Review Grammar and Composition**

W. 5 cl.

Prereq.: 104.

Review of Hebrew grammar; composition on assigned topics and some practice in translation. Hayon.

402 U 5

**Intermediate Hebrew Conversation and Composition**

Sp. 5 cl.

Prereq.: 401 or permission of instructor.

Vocabulary building, practice in speaking Hebrew, conversation and composition dealing with social and everyday aspects of Israeli life. Hayon.

403 U 3

**Hebrew Syntax**

A. 3 cl.

Prereq.: 402 or permission of instructor.

Parts of speech, types of sentences, word order, and syntactic analysis. Hayon.

421 U 3

**The Modern Hebrew Short Story**

A. 3 cl.

Prereq.: 104.

Reading and discussion of masterpieces of modern Hebrew short stories in the 19th and 20th centuries. Mashiah.

422 U 3

**Modern Hebrew Poetry**

W. 3 cl.

Prereq.: 421 or permission of instructor.

Reading and discussion of masterpieces of modern Hebrew poetry in the 19th and 20th centuries. Mashiah.

604 U G 3

**Hebrew Phonetics and Vocalization**

A. 3 cl.

Prereq.: 104 or permission of instructor.

Rules of Hebrew phonetics and vocalization; lectures and abundant practical exercises. Hayon.

605 U G 5

**Hebrew Morphology**

W. 5 cl.

Prereq.: 604 or permission of instructor.

The morphological system of Hebrew; the interrelations between roots and forms. Hayon.

611 U G 3

**Introduction to the History of the Hebrew Language**

Sp. 3 cl.

Prereq.: Permission of instructor.

Genealogical and typological relations within the Semitic family, a survey of Biblical, Mishnaic, and Modern Hebrew. Hayon.

621\* U G 3

**The Bible as Literature: Selected Readings**

W. 3 cl.

Prereq.: 421 or 422 or 423.

Lesley.

623\* U G 3

**Medieval Hebrew Poetry: Secular and Liturgical**

Sp. 3 cl.

Prereq.: 421 or 422 or 423.

The poetry of Samuel Ha-Nagid, Ibn Gabirol, Moses Ibn Ezra, and Yehuda Ha-Levi, and selections from the *Maqamas* of Al-Harizi, Zabara, Ibn Hasday, and Emmanuel Ha-Romi. Mashiah.

624†\* U G 3

**Hebrew Literature of Early Modern Times: From the Haskala Period until 1900**

Sp. 3 cl.

Prereq.: 421 or 422 or 423.

Literary works of the Haskala period and of the 19th century. Mashiah.

625\* U G 3

**Readings in H. N. Bialik**

Sp. 3 cl.

Prereq.: 421 or 422 or 423.

Poetry and prose of H. N. Bialik. Mashiah.

694 U G 1-15

**Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 30 cr. hrs.

**793 U G 1-5**  
**Individual Studies in Hebrew**

Su, A, W, Sp.  
 Prereq.: Permission of instructor.  
 Repeatable to a maximum of 15 cr. hrs.

**H783 U 3-5**  
**Honors Course**

Su, A, W, Sp.  
 Prereq.: 4th yr. standing with a grade of A in at least half of the Hebrew courses and an average of B in the remainder; permission of instructor under whose supervision the work is to be completed and the Arts and Sciences Honors Committee.  
 Repeatable to a maximum of 15 cr. hrs.  
 Offers graduates with special aptitudes a greater opportunity to do independent study than is possible in the ordinary course; work in conference, library, or phonetics laboratory.

**794 U G 1-15**  
**Group Studies**

Su, A, W, Sp.  
 Prereq.: Permission of instructor.  
 Repeatable to a maximum of 30 cr. hrs.

## History

Office: 190 West 17th Avenue

**Professors** Coles (Chairman), Adams, Bremner, Burnham, Chapin, Chu, Cooper, Dillon, Dorpalen, Fisher (Emeritus), Fullmer, Grimm (Emeritus), Hill (Emeritus), Li, McDonald (Emeritus), Morley, Pegues, Poirier, Ragatz (Emeritus), Roberts, Roseboom (Emeritus), Rule, Simms (Emeritus), Weisenburger (Emeritus), Woodring (Emeritus), and Young; **Associate Professors** Balcer, Chang, Chazan, Curran, Kerr, Kittelson, Millett, Rogel, Rothney, and Zahniser; **Assistant Professors** Bartholomew, Benedict, Blackford, Bowers, Boyd, Candeloro (Lima), Coats (Newark), Dale, Eckes, Findley, Ganz (Newark), Gates, Gregory, Hedlin, Hoffer, Hopkins, Juretic (Mansfield), Lindenfeld, Lynch, Raphael, Raymond (Mansfield), Reichard, Reinhardt (Lima), St. Clair, Smith, Snider, Steffel (Marion), Stoen, Thirty (Lima), Van Tine, Watts, and Whitaker (Marion).

**110 U 5**  
**Ancient and Medieval History**

**110.01 The Greco-Roman World from Homer to Augustus**

A, W, Sp. 5 cl.  
 Development of classical Greek civilization; the decline of the polis, the Hellenistic age; the rise of the Roman state; the Roman Empire and Greco-Roman civilization. Balcer, Gregory, and St. Clair.

**110.02 Medieval Europe**

A, W, Sp. 5 cl.  
 Medieval civilization in its social, economic, political, and cultural setting; the significance of the medieval world for the modern world and Euro-American society. Lynch and Pegues.

**110.03 Byzantine Civilization**

W. 5 cl.  
 The culture and civilization of medieval Constantinople as expressed in political and religious ceremony, ideology, everyday life, and art. Gregory.

**120 U 5**  
**Modern Europe**

Su, A, W, Sp. 5 cl.

**120.01 European Civilization, 1500-1789**

Not open to students with credit for 101 or 121.  
 An introduction to the political, social, diplomatic, economic, and intellectual history of Europe from 1500 to the outbreak of the French Revolution.

**120.02 European Civilization, 1789-1914**

Not open to students with credit for 102 or 122.  
 An introduction to the political, social, diplomatic, economic, and intellectual history of Europe from the French Revolution to the outbreak of the First World War.

**120.03 European Civilization, 1914 to Present**

Not open to students with credit for 123 or 215.  
 An introduction to the political, social, diplomatic, economic, and intellectual history of Europe from the outbreak of World War I to the present.

**130 U 5**  
**Africa and the Middle East**

**130.01 African History**

A, W. 5 cl.  
 Not open to students with credit for Black Studies 130.01.  
 (Cross-listed in the Black Studies Division.)  
 A general introduction to the history of Africa from pre-historic to recent times. Elango.

**150 U 5**  
**The Americas**

Su, A, W, Sp. 5 cl.

**150.01 History of the United States, 1763-1877**

Not open to students with credit for 103, 121, 122, or 230.

The general political, constitutional, and economic development of the United States from the beginning of the Revolutionary era to the end of the Civil War.

**150.02 History of the United States, 1877 to Present**

Not open to students with credit for 104, 122, 123, or 230.

A continuation of 150.01; the two provide a sequence but either may be taken independently as an elective.

**180 U 5**  
**Thematic Courses**

**180.01 Technological Revolutions and Their Consequences**

A. 5 cl.  
 Human, cultural, philosophic impact and significance of technological revolutions; analysis of representative turning points in technology affecting technical creativity and its inter-relation with human values. Smith.

**180.02 History of Scientific Revolutions**

Sp. 5 cl.  
 Models of scientific innovation and study of selected examples of the great scientific revolutions: Copernican, Chemical, Darwinian, Quantum, Genetic, and others. Burnham and Fullmer.

**180.03 The Indian in American Civilization**

A, W, Sp. 5 cl.  
 American Indian-white relations from colonial times to the present, focusing on changing conceptions of 'civilization', formation and implementation of policies, varying Indian responses to policies. Young.

**180.04 History of Mexico**

A. 5 cl.

History of Mexico during pre-colonial, colonial, and independence periods with emphasis on the 19th and 20th centuries. Cooper.

**194 U 5****Group Studies**

Su, A, W, Sp.

Repeatable to a maximum of 10 cr. hrs.

**211† U 3****Great Figures of Modern Europe**

A. 3 cl.

A study of modern European history through an examination of the lives and times of great figures. Rule.

**212 U 3****Great Figures in British History**

W. 3 cl.

British history since 1485 as illustrated in the lives of notable figures. Roberts.

**213 U 3****The History of the Medieval Church**

Sp. 3 cl.

The rise of the Christian church and the papacy; the Church Fathers; investiture controversy; heresy and monasticism; mysticism; the crisis of the late medieval church. Lynch and Pegues.

**214 U 5****History of the Early Church to A.D. 400**

Sp. 5 cl.

The origin and growth of the apostolic church; church, society, and state in the second and third centuries; the Christian Roman Empire; readings in sources. St. Clair.

**215 U 5****Contemporary Europe, 1914 to Present**

A, Sp. 5 cl.

Not open to students with credit for 120.03.

World War I; political, social, and economic developments of the interwar period; Communism, Nazism; World War II; Europe between East and West; moves toward unification. Dorpalen.

**220 U 5****Russian Civilization**

W, Sp. 5 cl.

A survey of Russian civilization from earliest times to 1917; geography, peoples, culture, social, political and religious institutions, and the impact of Westernization. Curran and Morley.

**230† U 5****American Civilization**

Sp. 5 cl.

Not open to students with credit for 103, 104, 121, 122, 123, 150.01, or 150.02.

A survey emphasizing the origin and development of basic ideals and institutions, continuing problems of American democracy, and the U.S. and world affairs. Coles.

**231 U 3****Great Figures in American History**

A, W, Sp. 3 cl.

Main trends of American development through the medium of biography; historical background, comparison and contrast of leading figures, and analysis of motivation and character. Bowers, Coles, and Van Tine.

**240 U 5****Latin America in the 20th Century**

W. 5 cl.

The history of Latin America in the 20th century. Stoan.

**247† U 5****Africa in the 19th Century**

A, Sp. 5 cl.

Not open to students with credit for Black Studies 247. (Cross-listed in the Black Studies Division.)

Emphasis on African societies during the century of the European scramble for colonies. Elango.

**248 U 5****Leadership and Mass Movements in Contemporary Africa**

W. 5 cl.

Not open to students with credit for Black Studies 248. (Cross-listed in the Black Studies Division.)

A survey of modern African leaders, their philosophies, and methods, and a study of the historical, geographical, economical, and political factors that gave rise to the drive for national independence after 1945. Elango.

**251 U 5****Jewish History I**

W. 5 cl.

Either 251 or 252 may be taken independently.

Jewry and Judaism from remote antiquity to the 15th century A.D. Chazan and Raphael.

**252 U 5****Jewish History II**

Su, Sp. 5 cl.

Either 251 or 252 may be taken independently.

Jewry and Judaism from the 15th century to the present. Chazan and Raphael.

**255 U 5****The Middle East from the Time of Muhammad to the 19th Century**

A, W. 5 cl.

Middle East history from Muhammad to Napoleon: preaching and spread of Islam; Arab Caliphates; the Crusades; Turks; Mongols; rise and decline of the Ottoman empire. Findley and Waldman.

**256 U 5****The Middle East in the 19th and 20th Centuries**

A, W. 5 cl.

Middle East history since Napoleon: reform and modernization; nationalism, European imperialism, and two world wars; Israel, oil, and world political systems. Findley and Waldman.

**260 U 5****Afro-American History**

A, W. 5 cl.

The Afro-Americans in North America from the 16th century to the present. Hamilton.

**265 U 5****History of East Asia to 1800**

A. 5 cl.

Not open to students with credit for 644.

East Asian civilization from the earliest time to 1800: Confucianism, Buddhism, Taoism; the Chinese high culture; the regional variations—Japan, Korea, and Vietnam. Bartholomew, Chang, and Chu.

**266 U 5****History of East Asia Since 1800**

W. 5 cl.

Not open to students with credit for 645.

The modernization of East Asia: the impact of the West; the response of the traditional societies; nationalism, fascism, communism. Bartholomew, Chang, and Chu.

**270 U 5****The History of Religions**

Su. 5 cl.

An introduction to the study of religious phenomena, with special attention to primitive religious thought; four major world religions. Raphael.

**280 U 5****The City: Ancient and Medieval**

A. 5 cl.

Cross-cultural study of the origins and development of the city from the beginning of civilization through the Middle Ages. Gregory.

**281 U 5****Perceptions and Roles of Women in the West from the Greeks through the 16th Century**

W. 5 cl.

The social and legal position of women; how attitudes toward women have both defined and contrasted with women's actual roles. Mate and Rose.

**282 U 5****Perceptions and Roles of Women in the West, 17th Century to the Present**

Sp. 5 cl.

A continuation of 281. Mate and Rose.

**285 U 3****Great Issues in American Constitutional History**

W. 3 cl.

A study of selected issues that have influenced the development of the federal constitution. Benedict and Chapin.

**290 U 5****Survey of American Intellectual History**

W. 5 cl.

Not open to students with credit for 690.01.

American thought from colonial times to the present with emphasis on the relation between dominant ideas and the behavior and beliefs of the population. Hoffer.

**294 U 3-5****Special Topics in History**

A, W, Sp.

Repeatable to a maximum of 15 cr. hrs.

Groups of students are given an opportunity to pursue special studies not otherwise offered.

**301 U 3****Major Influences in the History of Western Civilization**

Sp. 2 cl.

Offered by senior members of the staff and designed to acquaint the student with problems in the interpretation of the history of western civilization. Rule.

**537† U G 5****History of Southern Africa**

A. 5 cl.

Not open to students with credit for Black Studies 537. (Cross-listed in the Black Studies Division.)

A study of the processes and patterns of social change from early times to the present. Elango.

**538 U G 5****West African History**

Sp. 5 cl.

Not open to students with credit for Black Studies 538. (Cross-listed in the Black Studies Division.)

An examination of the processes of state formation, trade, and civilization in Africa's Sudanese and Guinean regions. Elango.

**565 U G 5****The United States in the 20th Century, 1900-1933**

A, Sp. 5 cl.

Prereq.: 104, 123, or 150.02.

An intensive study of the United States during the progressive era and after; the adjustment of institutions to industrialism. Kerr and Reichard.

**566 U G 5****The United States in the 20th Century, 1933 to Present**

A, W, Sp. 5 cl.

Prereq.: 104 or 123.

An intensive study of contemporary America in depression, war, and prosperity. Kerr and Reichard.

**581 U 5****Women in Social Movements in Europe and America**

Sp. 5 cl.

The roles of women in social reform movements, particularly feminist movements, during the 19th and 20th centuries. Rose.

**H599 U 3****Honors Proseminar in History**

A, W, Sp. 1 cl.

Prereq.: 15 cr. hrs. of 100-200 level Hist. courses with an average of 3.2 or better.

Students may not register for more than 2 decimal subdivisions below in any one quarter; no more than 15 cr. hrs. may be counted toward graduation; no more than 9 cr. hrs. may be counted toward the major in Hist.



Repeatable to a maximum of 15 cr. hrs.

Designed to give undergraduates experience in historical research and analysis of historical problems.

**H599.01 United States History**

**H599.02 West European History**

**H599.03 East European History**

**H599.04 Asian History**

**H599.05 Other Areas**

#### GENERAL PREREQUISITES FOR COURSES NUMBERED 600 AND 700

Unless otherwise indicated the prerequisites for 600 and 700-level courses are four quarter courses in the social science field, of which at least two must be in history.

Not open to freshmen and sophomores except with permission of instructor.

#### 600† U G 5

##### The Ancient History of the Near East

W. 5 cl.

The ancient history of Egypt, Mesopotamia, Anatolia, and Persia to the death of Alexander III; readings in the sources in translation. Balcer.

#### 601 U G 5

##### Greek History

###### 601.01 History of Archaic Greece

A. 5 cl.

Not open to students with credit for 601.

History of Greece from the early Stone Age communities to the end of the Greek-Persian conflicts, 479 B.C.; readings in the sources in translation. Balcer.

###### 601.02 History of Classical Greece

W. 5 cl.

History of classical Greece from the foundation of the Delian Confederacy to the death of Alexander III; reading in the sources in translation. Balcer.

###### 601.03 History of the Eastern Mediterranean During the Bronze Age

Sp. 5 cl.

Studies in the civilizations of Minoan Crete and Helladic/Mycenaean Greece in relationship with the Trojans, Hittites, Philistines, Cypriotes, Syrians, and Egyptians. Balcer.

#### 602 U G 5

##### The Hellenistic World

A. 5 cl.

The history of Greece and the Hellenistic monarchies from Alexander the Great to the Roman intervention; readings from sources in translation. St. Clair.

#### 603

##### Roman History

###### 603.01 The Roman Republic

U G 5

A. 5 cl.

Not open to students with credit for 603.

A history of Rome from the founding to the fall of the Roman Republic; readings in ancient sources in translation. St. Clair.

###### 603.02 Roman Civilization

U G 5

W. 5 cl.

Not open to students with credit for 604.

The history of the Roman Empire from Augustus to the 4th century; readings in the sources in translation. St. Clair.

#### 603.03 The Late Roman Empire, A.D. 235-476 U G 3

Sp. 3 cl.

Prereq.: 603.02 recommended.

General history of the decline of the western Roman Empire; the emergence of the Germanic kingdoms; particular problems which characterized the decline; reading in some sources. St. Clair.

#### 605

##### Jewish History

###### 605.01 The Second Commonwealth

U G 3

Sp. 3 cl.

Not open to students with credit for 715.

The restoration of Jewish statehood following the first Babylonian Exile and the history of Palestinian Jewry and of the Jewish Diaspora down to the 2nd century A.D. Raphael.

###### 605.02\* The Jewish Community under Medieval Christianity

U G 3

W. 3 cl.

Not open to students with credit for 716.

The legal, social, economic, and cultural position of the Jews in the Late Roman Empire and in Western Europe from the 4th century A.D. to 1500. Chazan.

###### 605.03†\* Jewry and Judaism in the Orbit of Islam

U G 3

A. 3 cl.

Not open to students with credit for 717.

History of the Jews in the Near East and North Africa from the Arab conquests to about 1500. Chazan.

###### 605.04\* Jews in the Western World in Modern Times

U G 3

Sp. 3 cl.

Not open to students with credit for 718.

Changing patterns of Jewish life since the Jews' struggle for Emancipation; migration movements and the shift of Jewish centers in Europe and the New World. Chazan.

###### 605.05†\* The Jewish Settlement in Palestine from the Ottoman Conquest to Modern Times

U G 3

A. 3 cl.

Not open to students with credit for 719.

The flourishing Palestinian Jewish Center in the 16th century; Jewish immigration to Palestine; rise of modern Zionism; the British Mandate, and the State of Israel. Chazan and Raphael.

###### 605.06\* History of Ancient Israel

U G 3

A. 3 cl.

Not open to students with credit for 720.

The rise of the Jewish nation and religion in the Ancient Near East; settlement in Canaan; the Israelite and Judean monarchies until their conquest by Assyria and Babylonia. Raphael.

###### 605.07\* The World of the Talmud

U G 3

A. 3 cl.

Not open to students with credit for 721.

The development of Jewish law and institutions in Palestine and Babylonia after the destruction of the Second Commonwealth; Rabbinic Judaism and diasporic Jewish self-government. Chazan and Raphael.

###### 605.08\* Jews in the Mediterranean World

U G 3

Su. 3 cl.

Not open to students with credit for 722.

East Mediterranean Jewry under the Byzantine Empire, its successor states, and under the Ottoman Turks; the Jews in Italy; rise and fall of Spanish Jewry. Chazan.

**605.09†\* Jews in Eastern Europe U G 3**

A. 3 cl.

Not open to students with credit for 723.

East European Jewish communities: their origin and function within medieval Polish society; self-governing institutions of Polish and Lithuanian Jewry; the "Jewish Question" in Tzarist Russia. Raphael.

**605.10†\* Messianic and Sectarian Movements in Jewry U G 3**

Sp. 3 cl.

Not open to students with credit for 724.

The history, doctrines, and polemics of the secessionist groups in medieval Jewry from the 7th to the 18th centuries. Chazan and Raphael.

**605.11 Jews in America U G 3**

A. 3 cl.

Not open to students with credit for 725.

The rise and development of the American Jewish community from colonial times to the present. Raphael.

**605.12 Jewish Historians and Historiography U G 5**

W. 5 cl.

A study of the major Jewish historians, their lives and writings, and an introduction to various philosophies of Jewish history. Raphael.

**606 U G 5****Medieval History****606.01 Medieval Civilization**

A. 3 cl.

Not open to students with credit for 606.

The decline of the Roman Empire; the rise of Christianity; analysis of feudalism and manorialism; the Great Economic Revival, and the origins of Western society. Pegues.

**606.02 Medieval Social and Economic History to 1200**

W. 5 cl.

A treatment of the Germanic invasions, manorialism, feudalism, urban life, commerce, and popular heresy from the late Roman Empire to the 13th century. Lynch.

**606.03 Medieval Intellectual History**

Sp. 5 cl.

Intellectual life from the late Roman Empire to the 14th century; concentration on the ancient heritage; medieval "Renaissances"; schools; books; universities; literary genres; scholasticism; rise of humanism. Lynch.

**607 U G 5****Byzantine History****607.01 Byzantine Empire I**

A. 5 cl.

History of Byzantium, A.D. 330-843, with emphasis on internal political and religious developments and the relationship between Byzantium and its neighbors. Gregory.

**607.02 Byzantine Empire II**

W. 5 cl.

History of Byzantine, A.D. 843-1453, with emphasis on internal developments, the Crusades, the Fall of the City, and the legacy of Byzantine. Gregory.

**609 U G 3****The Renaissance**

W. 3 cl.

The literary, artistic, and intellectual achievements primarily of Renaissance Italy against the economic, political, and social developments in western Europe. Kittelson and Pegues.

**610 U G 5****The Reformation**

Sp. 5 cl.

The rise and growth of Protestantism and the Catholic reformation of the 16th century against the economic, political, and social developments in western Europe. Kittelson.

**History of Biology**

(See Bot. 601.)

**612 U G 5****Europe, 1600-1775**

W. 5 cl.

A study of the rise of the absolute state, the changing diplomatic alignments, and the Enlightenment. Rule.

**613† U G 5****The French Revolution and Napoleon**

Sp. 5 cl.

The background of the Revolution; the social bases and political schisms of the first three Revolutionary governments, 1789-1795; the program and role of Napoleon. Rule.

**614 U G 5****Europe, 1815-1914**

W. 5 cl.

Nationalism, the democratic movement, economic growth, imperialism, and cultural advance from the Congress of Vienna to World War I. Rogel.

**615 U G 5****France, 1815-1914**

A. 5 cl.

France's transformation from a rural, traditional society to a modern, industrial society, and the relation of this transformation to 19th century political and intellectual movements. Rothney.

**616 U G 5****France in the 20th Century**

Su, W. 5 cl.

The impact on France of two world wars, the depression and decolonization, with emphasis on the breakdown of the political system and the emergence of a new society from the wreckage of the old. Rothney.

**618 U G 5****Modern Germany, 1815 to Present**

A, W. 5 cl.

Political, social, economic, and cultural developments; the national and liberal movements; unification; Empire; Weimar Republic; Nazi Regime; present-day Germany. Dorpalen and Gates.

**619 U G 5****Rise of Modern Physical Science, 1500-1778**

A. 5 cl.

Prereq.: Jr. standing.

The history of the physical sciences, 1500-1778. Fullmer.

**620 U G 3****European Diplomacy, 1871-1939**

A. 3 cl.

Imperialism and the Alliance systems leading to World War I; the Paris Peace Conference, and the political and economic diplomacy prior to World War II. Boyd.

**621 U G 5****The Rise of Modern Physical Science, 1779-1904**

Sp. 5 cl.

Prereq.: Jr. standing.

The physical sciences from the end of the Enlightenment to 1904 and their intellectual and institutional interrelationships with Western society. Fullmer.

**622 U G 5****European Intellectual History****622.01 Intellectual History of 19th Century Europe**

A. 5 cl.

Not open to students with credit for 622.

Ideas of ideologies in their social and economic setting, including laissez-faire liberalism, Darwinism, and the various schools of socialism. Poirier.

**622.02 Intellectual History of 20th Century Europe**

W. 5 cl.

European thought as it anticipates and reflects the crises of the 20th century: the new physics, psychoanalysis, phenomenology, the modern novel, existentialism, and political thought. Lindenfeld.

**623 U G 5****Economic History of Modern Europe, 1700-1840**

W. 5 cl.

Factors of pre-industrial economic growth, economic policies of the European states, evolution of economic thought, the first Industrial Revolution and its effects on European society. Gates.

**624 U G 5****Economic History of Modern Europe, 1840 to Present**

Sp. 5 cl.

Comparative study of industrial expansion, economic liberalism, protectionism, socialism, productivity and social reform in the 20th century, economic effects of the World Wars. Gates.

**625 U G 5****History of European Warfare****625.01 History of European Warfare from the Renaissance to 1815**

W. 5 cl.

Not open to students with credit for 745.

An analysis of military affairs and of their interaction with political, economic, and social history. Boyd.

**625.02 History of European Warfare from 1815 through the Second World War**

Sp. 5 cl.

A continuation of 625.01; an analysis of war and society in the 19th and 20th centuries. Boyd.

**626 U G 5****East Central Europe****626.01 The Habsburg Empire, 1740-1918**

Sp. 5 cl.

Not open to students with credit for 735.

A century and a half of Habsburg history with emphasis on Austria's responses to Enlightenment ideas, the French Revolution, social change, industrialization, and emerging nationalisms. Rogel.

**626.02 The Balkans from the Ottoman Conquest to World War I**

W. 5 cl.

Not open to students with credit for 736.

A historical survey of the Balkan peoples; political, social, economic, and cultural development; emphasis on the emergence and expression of Balkan nationalisms. Rogel.

**626.03 East Central Europe Since 1919**

A. 5 cl.

Not open to students with credit for 737.

A survey of East Central Europe from the end of World War I to the present. Rogel.

**628† U G 5****Africa and the Western World in the 19th and 20th Centuries**

A. 5 cl.

Economic penetration, the conflict of cultures, political developments, and social advance.

**630 U G 5****Medieval England**

W. 5 cl.

England from the Roman conquest to 1485; Anglo-Saxon society and institutions; the Norman conquest; law and parliament; social, intellectual, and economic growth of the English people. Pegues.

**631 U G 5****Tudor and Stuart England**

Sp. 5 cl.

The religious, political, economic, imperial, and intellectual development of the English people from 1485 to 1714, with special attention to the constitutional struggles of the 17th century. Roberts.

**632 U G 5****England in the 18th and 19th Centuries**

W. 5 cl.

The course of political, social, and intellectual change, of industrial and commercial growth of Hanoverian, Victorian, and Edwardian England. Poirier.

**633 U G 5****England in the 20th Century**

Sp. 5 cl.

A study of Britain since 1900 with special emphasis on the rise of the Labour party and the development of the social welfare state. Poirier.

**634 U G 5****The Soviet Union and East-West Relations, 1917 to Present**

W. 5 cl.

Evolution of the structure, personalities, and principles of both the Russian Communist Party and the State, and their effects on the external affairs of the U.S.S.R. Hedlin.

**635 U G 5****History of Russia, to 1801**

A. 5 cl.

A survey from the origins of the Russian state to the end of the 18th century. Curran.

**636 U G 5****History of Russia, 1801-1914**

Su, W. 5 cl.

A survey from the accession of Alexander I to the outbreak of the First World War. Curran and Morley.

**637 U G 5****Soviet Russia**

A, Sp. 5 cl.

Beginning with the background and events of the revolution of 1917, this course analyzes developments in Russian history from World War I to the present. Morley, Curran, and Hedlin.

**638 U G 5****Russian Intellectual History**

W. 5 cl.

A survey of the main currents of Russian social, political, economic, and philosophical thought in the 19th century; Liberalism, Conservatism, and Socialism. Curran.

**639\* U G 3****Modern Poland**

A. 3 cl.

While several background lectures deal with the partitions of Poland and the revolutions of the 19th century, emphasis is placed on the period since 1918. Morley.

**641 U G 3****The Rise of Islam and the Spread of Muslim Civilization**

A. 3 cl.

Life and teachings of Muhammad; Umayyad and Abbasid empires; the Crusades, Islamic culture and learning through the ages; the decline under the Mongols; terminal date, 1517. Waldman.

**642 U G 3****The Rise and Fall of the Ottoman Empire**

W. 3 cl.

A study of the significance of the Middle East with respect to Europe from the 13th century to World War I. Findley.

**643 U G 5****The Middle East Since 1914**

Sp. 5 cl.

National and international problems following the collapse of the Ottoman empire; the Turkish Republic; the state of Israel; Arab unity; and the conflict between East and West. Findley.

**647 U G 5****History of Traditional Japan**

W. 5 cl.

Prereq.: 265 or permission of instructor.

Problems regarding the political, intellectual, and institutional history of Japan prior to the arrival of Perry (1851). Bartholomew.

**648 U G 5****History of Modern Japan**

Sp. 5 cl.

Prereq.: 266 or permission of instructor.

Political, social, and intellectual history of Japan from the beginning of the Meiji Period (1868) to the present. Bartholomew.

**650 U G 5****History of Spain, 1469 to Present**

A.

The unification of Spain under Ferdinand and Isabella; the Golden Age; Enlightened Despotism of the 18th century; the Napoleonic Wars; the Generation of 1898; the Republic and the Civil War; the regime of Francisco Franco. Stoen.

**651 U G 5****Latin American History****651.01 Colonial Latin American History**

Su, A. 5 cl.

Not open to students with credit for 651.

Mayan, Aztec, and Inca Empires; the Spanish and Portuguese conquests and the transplanting of Iberian institutions; the Baroque period; the Bourbon Century and the Enlightenment. Stoen.

**651.02 South America Since Independence**

W. 5 cl.

Not open to students with credit for 652.

Nation-building in the South American republics during the 19th and 20th centuries with special emphasis on Argentina and Brazil. Stoen.

**651.03 Northern Latin America Since Independence**

Sp. 5 cl.

Not open to students with credit for 653.

Survey of leading political, economic, and social developments in Mexico, Central America, and the West Indies in the 19th and 20th centuries. Cooper.

**651.04† Social and Economic History of Latin America**

A. 5 cl.

Not open to students with credit for 655.

Patterns in the history of race, class, land, industry, and foreign influences; emphasis on the National Period, and on Mexico, Argentine, and Brazil. Cooper.

**651.05† The Portuguese Colonial Empire, 1415-1822**

W. 5 cl.

Not open to students with credit for 691.

Emphasis on Brazil including some related materials on colonialization in Africa and Asia; thematic approach to imperial political, economic, and cultural development; independence of Brazil. Cooper.

**651.06† Modern Brazil, 1822 to Present**

Sp. 5 cl.

Not open to students with credit for 692.

Independence from Portugal; the monarchical experiment; political, social, economic, and military developments; foreign relations; republican Brazil. Cooper.

**651.07 History of Mexico**

A. 5 cl.

Not open to students with credit for 699.

History of Mexico during precolonial, colonial, and independence periods with emphasis on the 19th and 20th centuries. Cooper.

**656 U G 5****The American Colonies**

Su, A. 5 cl.

The transplanting of European civilization to North America, the resultant international rivalries, and the political, social, and economic life of the English colonies to 1763. Bowers, Chapin, and Coles.

**658 U G 5****The American Revolution and New Nation, 1763-1800**

W, Sp. 5 cl.

A continuation of 656 but may be taken separately; primary emphasis on social, intellectual, and economic factors. Bowers, Chapin, and Coles.

**659 U G 5****Jefferson and Jacksonian Democracy, 1800-1840**

Su. 5 cl.

A continuation of 658 but may be taken separately. Primary emphasis on ideological, cultural, and political factors. Bowers, Chapin, and Coles.

**660 U G 5****The Westward Movement Since 1783**

Sp. 5 cl.

The westward spread of settlement and the influence of the westward movement on American development. Blackford and Young.

**661† U G 3****The Slavery Controversy in the United States**

A. 3 cl.

The social system of the Old South; the various aspects of the controversy; secession and the impact of war. Dillon.

**662† U G 3****Reconstruction and the New South, 1863 to Present**

W, Sp. 3 cl.

The controversy over Reconstruction; the social and economic readjustments in Southern States during and after Reconstruction. Dillon and Benedict.

**663 U G 3****History of Technology in America****663.01 History of Technology in America to 1876**

W. 3 cl.

From craft to "know-how"; European transfers; sources of invention; specific patterns of technical change; rise of professional engineering; technology and culture. Smith.

**663.02 History of Technology in America Since 1876**

Sp. 3 cl.

A historical inquiry into the problems and promises of Machine Age America with emphasis on the nature of technological change and society's reaction to that change. Smith.

**664 U G 5****The Emergence of Modern America, 1865-1898**

W, Sp. 5 cl.

An intensive study of the political, social, and cultural transformation of the United States in the late 19th century. Van Tine.

**668 U G 5****American Military Policy**

A, Sp. 5 cl.

The development of American military policy, 1763 to the present, in relation to its political, economic, and social implications. Coles and Millett.

**670 U G 5****American Foreign Policy to 1914**

A. 5 cl.

Emphasis on these topics: the revolution, neutral rights, the Monroe Doctrine, continental expansion, the Civil War, overseas expansion, Far Eastern policy. Eckes and Zahniser.

**671 U G 5****American Foreign Policy Since 1914**

W, Sp. 5 cl.

Emphasis on these topics: United States relations with Europe, Far East, and Latin America since 1914. Eckes and Zahniser.

**672 U G 5****Social and Economic History of the United States, 1815-1865**

A. 5 cl.

The development of economic institutions and their relation to economic growth and to movements for social and political reform. Young.

**673 U G 5****Social and Economic History of the United States, 1865-1914**

W. 5 cl.

The development of an integrated national economy and society; its extensive and intensive expansion. Blackford, Kerr, Van Tine, and Young.

**674 U G 5****Social and Economic History of the United States, 1914 to Present**

Sp. 5 cl.

The development of social and economic institutions for a society characterized by high mass consumption; the increasing role of government in the economy. Van Tine and Young.

**676† U G 5****The Influence of Immigrant Groups Upon United States History**

W. 5 cl.

The share of different immigrant groups in the building of the nation, from the colonial period to the present. Hopkins, Raphael, and Van Tine.

**677 U G 3****History of American Philanthropy and Social Welfare**

Su. 3 cl.

Prereq.: 104, 123, or 150.02 or permission of instructor. Major influences in American philanthropy and social welfare since the colonial period. Bremner.

**678† U G 5****American Social Thought, 1865-1919**

A. 5 cl.

Prereq.: 104, 123, or 150.02.

Trends in American social thought in the late 19th and early 20th centuries. Bremner.

**679† U G 5****American Social Thought Since 1919**

W. 5 cl.

Prereq.: 104, 123, or 150.02.

A historical examination of trends in American social thought since World War I. Bremner.

**680 U G 3****History of American Science to 1900**

W. 3 cl.

Flowering of scientific inquiry in colonial America; professionalization and expansion of science in the 19th century; Darwinism in America; positivism. Burnham.

**681† U G 3****History of American Science Since 1900**

W. 3 cl.

Pragmatism, progressivism, and science; American scientific leadership; the impact of war and depression; the modern scientific crisis. Burnham.

**682 U G 5****Political Parties in the United States**

W. 5 cl.

The origin and growth of national parties and the history of party struggles with emphasis upon presidential elections. Reichard.

**683 U G 3****The History of Ohio**

Su, W. 3 cl.

A general survey of state history—social, economic, religious, and political—from the Indian period to the present time. Coles and Hopkins.

**684 U P G 3****History of American Medicine**

Sp. 3 cl.

Disease, public health, and the profession and practice of medicine in America from colonial times to the present. Burnham.

**685 U G 5****United States Constitutional History:  
The Federal System**

Su. 5 cl.

Historical development of constitutional powers and functions of the federal and state governments and intergovernmental relationships. Benedict and Chapin.

**686† U G 5****United States Constitutional History:  
Rights and Immunities**

A. 5 cl.

Historical development of the constitutional rights and immunities of the citizen. Benedict and Chapin.

**687 U G 3****United States History and the Social Sciences**

Sp.

Prereq.: 20 cr. hrs. of 600-level Hist. courses.

Recent developments in the theory and practice of history as a social science using American historical materials. Burnham.

**688 U G 5****American Urban History**

A. 5 cl.

**688.01 American Urban History Since Colonial Times**

A survey of American urban development, and its impact on national history, from the beginning of colonization to the present. Hopkins.

**689 U G 5****American Labor History**

A. 5 cl.

**689.01 History of the American Labor Movement**

Evolution of trade unionism in American life from the late 18th century to the present; attention to critical evaluation of changes in labor history. VanTime.

**690 U G 5****American Intellectual History**

A. 5 cl.

**690.02† Roots of American Thought**

A. 5 cl.

European origins of and influences upon American thought from 1600 to 1800, and American reactions; survey of political, economic, social, and religious questions. Hoffer.

**690.03 American Historical Writing and the  
Intellectual Scene**

Sp. 5 cl.

Historians, as representatives and observers of their times, from Cotton Mather to the New Left. Hoffer.

**693 U G 1-3****Individual Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Individual study in some field of historical development; designed to allow the student to work on a problem in which he is particularly interested.

**694 U G 1-5****Group Studies**

A, W, Sp.

Repeatable to a maximum of 30 cr. hrs.

The investigation of particular problems in various fields of history.

**695 U G 5****Classical China, 1400 B.C. to 220 A.D.**

A. 5 cl.

Prereq.: 265 or permission of instructor.

The political, economic, and cultural life of ancient China from the Shang dynasty to the end of the Han dynasty. Chang and Chu.

**696 U G 5****Traditional China, 220 A.D. to 1800 A.D.**

W. 5 cl.

Prereq.: 265 or permission of instructor.

The political, economic, and cultural life of Medieval China from the Age of Disunity to 1800 A.D. Chang and Chu.

**697 U G 5****Modern China, 1800 to 1949**

Sp. 5 cl.

Prereq.: 266 or permission of instructor.

History of modern China with emphasis on cultural contact between China and the West. Chang.

**706† U G 3****Studies in Medieval History**

A. 1 2-hr. cl.

Prereq.: Grad. standing or permission of instructor.

Advanced reading course in sources and monographs on the principal issues and problems in medieval history, with a stress on bibliography. Gregory, Lynch, and Pigues.

**708† U G 3****Studies in Ancient History**

A,W, Sp. 1 2-hr. cl.

Prereq.: Grad. standing or permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

An intensive study of selected problems and sources in ancient history (Near Eastern, Greek and/or Roman); readings in the primary and secondary materials. Balcer and St. Clair.

**710† U G 3****Studies in Reformation History**

Sp. 1 2-hr. cl.

Prereq.: Grad. standing or permission of instructor.

An advanced course that treats the principal issues in the history of the Reformation on the basis of the most important literature. Kittelson.

**712 U G 3****Studies in the Age of Louis XIV**

W.

Prereq.: 612 or permission of instructor.

Open only to grad. students and by permission to seniors majoring in Hist.

Lectures, reading, and discussion of selected topics. Rule and Snider.

**714 U G 3****Studies in French History Since 1815**

A.

Prereq.: Grad. standing or by permission to seniors majoring in Hist.

Repeatable to a maximum of 6 cr. hrs.

An intensive study, through reading and discussion of standard works and recent scholarship, of the chief interpretative problems of modern French history. Rothney.

**726 U G 3****Studies in Jewish History**

A.

Prereq.: Grad. standing or by permission to seniors majoring in Hist.

An intensive study of selected issues in Jewish history; emphasis on problems posed by available source material and by current research in the area. Chazan and Raphael.

**730† U G 3****Studies in European History, 1815 to 1914**

W.

Open only to grad. students and by permission to seniors majoring in hist.

Political and social impact of Industrial Revolution; authoritarianism vs. liberalism; Church vs. State; nationalism; imperialism; emphasis on methods of historical research and documentary analysis. Dorpalen.

**731 U G 3****Studies in European History, 1914 to Present**

A.

Open only to grad. students and by permission to seniors majoring in hist.

Political, social, and economic developments: World Wars I and II; Communism, Nazism; present-day Europe; emphasis on methods of historical research and documentary analysis. Dorpalen.

**732 U G 3****Studies in German History**

W.

Prereq.: 618 or equiv.

Open only to grad. students and by permission to seniors majoring in hist.

Exploration of selected topics of 19th and 20th century German history; emphasis on methods of historical research and documentary analysis. Dorpalen.

**733† U G 3****Studies in German Social and Economic History**

Sp. 1 cl.

Prereq.: 618 or 624, or permission of instructor.

Open only to grad. students and by permission to seniors majoring in hist.

Exploration of selected problems in the modernization of German society and the German economy since the late 18th century. Gates.

**738 U G 3****Studies in British History**

W.

Prereq.: 632 or 633.

Open only to grad. students and by permission to seniors majoring in Hist.

Selected problems in British history since 1760; emphasis on different schools and interpretations, on methods of research, and on analysis of documents. Poirier.

**740 U G 3****Studies in Russian History: Catherine the Great Through the Crimean War, 1762-1855**

A.

Prereq.: 6 cr. hrs. of Russ. history or permission of instructor.

An intensive study of problems in selected periods of Russian history. Curran and Morley.

**741† U G 3****Studies in Russian History: Alexander II through the Bolshevik Revolution, 1855-1917**

Sp.

Prereq.: 5 cr. hrs. of Russ. history or permission of instructor.

An intensive study of problems in selected periods of Russian history. Curran and Morley.

**751† U G 3**

**Studies in Latin American History**

W. 1 2-hr. cl.

Prereq.: Grad. standing or permission of instructor for seniors majoring in Hist. or a cognate Latin American field.

Repeatable to a maximum of 6 cr. hrs.

An intensive study of problems in selected periods of Latin American history. Cooper and Stoen.

**761† U G 3**

**Studies in Mid-19th Century American History**

W.

Prereq.: Grad. standing or by permission to seniors majoring in hist.

Repeatable to a maximum of 6 cr. hrs.

An intensive study of selected topics with emphasis on historiography and bibliography. Dillon.

**768 U G 3**

**Studies in Military Thought and Strategy**

W.

Prereq.: 668 or equiv.

Analysis and comparison of the most influential writers on the theory and practice of warfare including Machiavelli, Clausewitz, Mahan, Bloch, and Douhet. Millett.

**770 U G 3**

**Studies in American Foreign Policy, 1775 to 1914**

W.

Prereq.: 670.

Studies in the main problems of American foreign policy with primary emphasis on basic literatures and selected primary materials. Zahniser and Eckes.

**771 U G 3**

**Studies in American Foreign Policy, 1914 to Present**

Sp.

Prereq.: 671.

Studies in the main problems of American foreign policy with primary emphasis on basic literature and selected primary materials. Eckes and Zahniser.

**777 U G 3**

**Studies in the History of American Philanthropy and Social Welfare**

Su. 1 2-hr. cl.

Prereq.: 677 or permission of instructor.

Documentary and monographic readings on the history of American philanthropy and social welfare.

**781† U G 3**

**Studies in the History of Women**

A. 1 2-hr. cl.

An intensive study of selected issues in the history of women with emphasis on historiography and bibliography. Rose and Van Tine.

**H783**

**U 3-5**

**Honors Course**

Su, A, W, Sp.

Prereq.: 4th yr. standing and 40 cr. hrs. in hist. courses with a grade of A in at least half of the hist. courses and an average of B in the remainder; permission of instructor under whose supervision the work is to be completed and the Arts and Sciences Honors Committee.

At least 2 qtrs. are required of candidates for the degree Bachelor of Arts **with distinction** in hist. Failure to receive a mark of S in this course is a disqualification for special honors.

Repeatable to a maximum of 15 cr. hrs.

Informal conferences to allow full scope to the initiative of the student; a special topic is assigned and results are tested by papers and special examinations.

**785**

**U G 3**

**Studies in Early American History**

Sp.

Studies in the basic historical literature of 17th and 18th century America. Chapin.

**788**

**U G 3**

**Studies in American Urban History**

W. 3 cl.

Prereq.: 688 or permission of instructor.

A detailed examination of several themes in the growth of urban America. Hopkins.

**789†**

**U G 5**

**Studies in American Labor History**

Sp. 1 2-hr. cl.

Prereq.: Grad. standing or permission of instructor.

An intensive study of selected issues in American labor history with emphasis on historiography and bibliography. Van Tine.

**791†**

**U G 5**

**Introduction to Historical Methods**

A. 5 cl.

The nature of history, collecting evidence, principles of criticism, the logic of historical explanation, generalizations in history, exposition and style. Roberts.

**795**

**U G 3**

**Studies in the History of Sino-American Relations**

W.

Prereq.: Permission of instructor.

A study of the commercial, cultural, and diplomatic relations between China and the United States in the 19th and 20th centuries. Li.

**796†**

**U G 3**

**Chinese Historiography**

Sp. 2 cl.

Prereq.: Permission of instructor.

The development of Chinese historical writing from ancient to modern times, with special emphasis on great historians and their representative works. Li.



799† U G 3

**Studies in Ming and Ch'ing History**

W.

Prereq.: 696 or permission of instructor.

Studies in the history of China under Ming and Ch'ing from 1368 to 1911, with special emphasis on important political leaders and institutions. Li.

800† G 5

**Seminar in European History**

A.

Research topic to be announced. Kittelson.

801 G 5

**Seminar in European History**

Sp.

Research topic to be announced later. Dorpalen and Gates.

802† G 5

**Seminar in European History**

A.

Curran and Morley.

803 G 5

**Seminar in European History**

Sp.

Poirier and Roberts.

804 G 5

**Seminar in European History**

Sp.

Research topic to be announced. Rogel.

805 G 5

**Seminar in European History**

Su, Sp.

Rule and Rothney.

806† G 3

**Late Medieval Paleography and Diplomatics**

Sp.

Prereq.: Permission of instructor.

Cursive hands in literature and diplomas, 1200-1500; the development of chanceries; notariats, secretariats, and the science of diplomatics; exercises with facsimiles, slides, and microfilm. Pegues.

807 G 5

**Seminar in Medieval History**

Sp.

Repeatable to a maximum of 15 cr. hrs.

Pegues.

808† G 5

**Seminar in Ancient History**

A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Topic to be announced. Balcer and St. Clair.

813 G 5

**Great European Historians**

A.

A study of the leading historical writers and schools of Europe, with selected readings from representative writers. Roberts and Rothney.

814 G 5

**Great American Historians**

A. 1 cl.

A study of the leading American writers and schools of history. Hoffer.

840 G 5

**Seminar in the History of the Physical Sciences**

Sp.

Prereq.: Permission of instructor.

Research topic to be announced. Fullmer.

845 G 5

**Seminar in East Asian History**

Sp.

Prereq.: Permission of instructor.

Research topic to be announced. Li, Chang.

850 G 5

**Seminar in History**

Sp.

Prereq.: Permission of graduate chairman and department chairman.

Research topic to be announced. Coles, Gates, Hopkins, Pegues, and Young.

851 G 5

**Seminar in Latin American History**

W.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Cooper and Stoen.

862 G 5

**Seminar in Jewish History**

W.

Chazan and Raphael.

865† G 5

**Two-Quarter Seminar in American Social and Intellectual History**

W.

Prereq.: Permission of instructor.

865 must be followed by 866.

Bremner.

866† G 5

**Two-Quarter Seminar in American Social and Intellectual History**

Sp.

Prereq.: 865 and permission of instructor.

Bremner.

867† G 5

**Seminar in American History**

Su, A, Sp.

Research topic to be announced. Dillon and Benedict.

**868 G 5**  
**Seminar in American History**

W.  
 Research topic to be announced. Kerr and Young.

**869 G 5**  
**Seminar in American History**

W, Sp.  
 Research topic to be announced. Bowers, Chapin, and Young.

**870 G 5**  
**Seminar in American History**

Su, W.  
 Research topic to be announced. Bremner, Coles, Van Tine, and Zahniser.

**871 G 5**  
**Recent History of the United States, 1898-1928**

Sp. 5 cl.  
 The impact of modern industrialism upon American imperialism, society, government, and foreign policy; laissez-faire and government regulations, the Progressive movement, and the First World War. Bremner, Burnham, and Kerr.

**872† G 5**  
**Recent History of the United States, Since 1928**

W. 5 cl.  
 Continuation of 871, but may be taken separately. Prosperity and depression, the New Deal, the United States in international affairs, and the Second World War. Bremner, Burnham, and Kerr.

**873† G 5**  
**Seminar in United States Military History**

Sp.  
 Prereq.: 668 or equiv.  
 Repeatable to a maximum of 15 cr. hrs.  
 Millett.

**880 G 1**  
**History of Psychiatric Concepts**

Sp. 1 cl.  
 Prereq.: Permission of instructor.  
 Psychiatric concepts and practices in their intellectual and social milieu from the Enlightenment to the 20th century. Burnham.

**Medieval and Renaissance Culture**  
 (See Medieval and Renaissance Studies 888.)

**Medieval and Renaissance Literature**  
 (See Medieval and Renaissance Studies 889.)

**899 G 1-5**  
**Interdepartmental Seminar**

A, W, Sp.  
 (See under Interdepartmental Seminars.)

**999 G Arr.**  
**Research in History**

Su, A, W, Sp.  
 Research for thesis or dissertation purposes only.

## History of Art

Office: 240 Hopkins Hall, 128 North Oval Drive

**Professors** Ludden (Chairman) and Melnikas; **Associate Professors** J. Huntington and Odita; **Assistant Professors** S. Herzog, S. Huntington, Keyes, Mealy, and Rubright; **Instructors** Jensen, Kunin, Roth, and Sweet.

**111 U 5**  
**Introduction to Art**

Su, A, W, Sp. 5 cl.  
 Not open to juniors or seniors.  
 A study of meaning of visual form and imagery in architecture, sculpture, and painting.

**210 U 4**  
**Western Art I**

Su, A, W, Sp. 4 cl.  
 H210 (Honors) may be available to students enrolled in a college Honors Program or by permission of dept.  
 Prereq.: 2nd yr. standing.  
 A survey of Ancient and Early Medieval Art.

**211 U 4**  
**Western Art II**

A, W, Sp. 4 cl.  
 H211 (honors) may be available to students enrolled in a college honors program or by permission of dept.  
 Prereq.: 2nd yr. standing.  
 A survey of Romanesque, Gothic, Renaissance, and Mannerist Art.

**212 U 4**  
**Western Art III**

Su, A, W, Sp. 4 cl.  
 H212 (honors) may be available to students enrolled in a college honors program or by permission of dept.  
 Prereq.: 2nd yr. standing.  
 A survey from Baroque Contemporary Art.

**213 U 5**  
**Oriental Art**

A, Sp. 5 cl.  
 Prereq.: 2nd yr. standing.  
 A survey of Far Eastern Art: India, China, and Japan. S. Huntington.

**216 U 5**  
**Introduction to African Art and Archaeology**

A, 5 cl.  
 Prereq.: 2nd yr. standing.  
 The art and archaeology of sub-Saharan Africa with emphasis on the historic cultures of the Nok (250 B.C.), Igbo-Ukwu (ca. 800 A.D.), Ife (ca. 1300 A.D.), and Benin (ca. 1400-1900 A.D.). Odita.

**294 U 3-5**  
**Group Studies**

A, W, Sp.  
 Prereq.: 2nd yr. standing and permission of instructor.  
 Repeatable to a maximum of 10 cr. hrs.  
 Group studies on lower division level.

**515 U G 5****Renaissance Art in Italy**

Sp. 5 cl.

Prereq.: Junior standing.

Not open to hist. of art majors.

A study of architecture, sculpture, and painting in Italy during the 14th, 15th, and 16th centuries.

S. Herog.

**520 U G 5****Modern European Art**

Su, A. 5 cl.

Prereq.: Jr. standing.

Not open to History of Art majors or to students with credit for 635 or 636.

European Art from about 1800 to the present, with emphasis on the outstanding masters of painting and sculpture. Kunin.

**530 U 5****American Art**

W. 5 cl.

Prereq.: Jr. standing.

Not open to History of Art majors or to students with credit for 637 or 638.

A study of architecture, painting, and sculpture in America. Keyes.

**593 U 2-5****Individual Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Individual study in some field of historical development; designed to allow the student to work on a problem in which he is particularly interested.

**594 U 2-5****Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

The investigation of particular problems in various fields of the history of art.

**610 U G 5****African Art and Archaeology I**

W. 5 cl.

Prereq.: 216 or permission of instructor.

A study of the art and culture of the Western Sudan and Guinea Coast regions with emphasis on stylistic, historic, and archaeological implications. Odita.

**611 U G 5****African Art and Archaeology II**

Sp. 5 cl.

Prereq.: 216 or permission of instructor.

The study of the art and culture of the Equatorial Forest and Southern Savannah regions with emphasis on stylistic, historic, and archaeological implications. Odita.

**614 U G 5****Comparative Study of African and European Art**

W. 5 cl.

Prereq.: 610 or 611 or 636.

A critical study of the relationships between African and European Art involving theory and practice. Odita.

**620 U G 5****Greek Archaeology**

Sp. 5 cl.

Prereq.: 210 or 10 cr. hrs. in Classics or permission of instructor.

Archaeological techniques in Greek lands; art and archaeology of Minoan-Mycenaean civilizations; ancient Greek cities, shrines, and cemeteries. Rubright.

**621 U G 5****The Art of Ancient Egypt and the Near East**

W. 5 cl.

Prereq.: 210 or permission of instructor.

The specialized study of the art and archaeology of the valleys of the Nile and Tigris Euphrate in ancient times. Rubright.

**622 U G 5****Ancient Greek Art**

A. 5 cl.

Prereq.: Either 210, 10 cr. hrs. in Classics, 10 cr. hrs. in ancient history, or permission of instructor.

Not open to freshmen or sophomores.

A study of the development of Greek art from 1000 B.C. to 146 B.C. including sculpture, architecture, vase painting, and other minor arts. Rubright.

**623 U G 5****Ancient Roman Art**

W. 5 cl.

Prereq.: Either 210, 10 cr. hrs. in Classics, 10 cr. hrs. in ancient history, or permission of instructor.

Not open to freshmen or sophomores.

An examination of the architecture, sculpture, and painting of Roman Italy and her Empire from its beginnings down to ca. 330 A.D. Jensen.

**624 U G 5****Early Christian and Byzantine Art**

A. 5 cl.

Prereq.: 210 or permission of instructor.

The Christian art of the Mediterranean region to the 8th century and the art of the Byzantine Empire to the 15th century.

**625 U G 5****Romanesque and Gothic Art**

W. 5 cl.

Prereq.: 210 and 211 or permission of instructor.

The art of Western Europe from the Carolingian period to the 14th century. Ludden.

**627 U G 5****Northern Renaissance Art**

Su, Sp. 5 cl.

Prereq.: 211 or permission of instructor.

The art of The Netherlands, France, Germany, and England from 1400 to 1600—with emphasis on Jan van Eyck, Rogier van der Weyden, Fouquet, Durer, Holbein, Bosch, and Breughel. Mealy.

**628 U G 3****Precursors to the Renaissance Art of Italy**

A. 3 cl.

Prereq.: Jr. standing.

The establishment of Florentine and Sienese schools of painting during the 13th and 14th centuries as reflected in the works of Giotto and Simone Martini. Melnikas.

**629 U G 5****Fifteenth Century Italian Art**

Su, W. 5 cl.

Prereq.: Jr. standing.

A selective study of painting and sculpture of the Quattrocento. Melnikas.

**630 U G 5****Sixteenth Century Italian Art**

Sp. 5 cl.

Prereq.: Jr. standing.

A study of the major artists of the High Renaissance and Mannerist periods in Italy. Melnikas.

**631 U G 5****Art of the 17th Century in Europe**

A. 5 cl.

Prereq.: Jr. standing.

Baroque Art in Italy, France, Spain, and the Lowlands—with emphasis on the major artists.

**634 U G 5****The Art of the 18th Century in Europe**

W. 5 cl.

Prereq.: 212.

The development of architecture, painting, and sculpture from the late Baroque and Rococo to Historicism. Kunin.

**635 U G 5****Nineteenth Century European Art**

W. 5 cl.

Prereq.: 212 or permission of instructor.

Not open to students with credit for 520.

A study of European art from Neoclassicism through Post Impressionism; emphasizing the study of the works of the major painters. Keyes and Kunin.

**636 U G 5****Twentieth Century European Art**

Su, A, Sp. 5 cl.

Prereq.: 212 or permission of instructor.

Not open to students with credit for 520.

A study of the major achievements in painting, sculpture, and architecture since 1900.

**637 U G 5****American Art to 1900**

Sp. 5 cl.

Prereq.: 212 or permission of instructor.

Not open to students with credit for 530.

A study of the history of art in America from Colonial times to the end of the 19th century. Keyes.

**638 U G 3****Twentieth Century American Art**

Sp. 3 cl.

Prereq.: 212 or permission of instructor.

Not open to students with credit for 530.

A study of significant developments in 20th century American architecture, painting, and sculpture. Keyes.

**670 U G 5****Buddhist Art: Theory and History**

A. 5 cl.

Prereq.: 213 or permission of instructor.

An analysis of Buddhism and its bearing on the art of India, Nepal, Tibet, China, and Japan, and an opportunity to examine actual objects. J. Huntington.

**671†\* U G 5****The Art of India I**

A. 5 cl.

Prereq.: 213 or 9 cr. hrs. Hist. of Art.

Not open to students with credit for 616.

A cultural art history of India through classical times, ca. 650 A.D., in terms of monuments, people, and religious philosophies. S. Huntington.

**672\* U G 5****The Art of India II**

W. 5 cl.

Prereq.: 671.

Not open to students with credit for 617.

A cultural art history of post-classical India, Ceylon, Central Asia, Indonesia, and Indo-China. S. Huntington.

**673\* U G 5****Art of Central Asia**

W. 5 cl.

Prereq.: 213 or permission of instructor.

An analysis of the cross currents of style and iconography that constitute the pre-Moslem art of Central Asia. J. Huntington.

**674 U G 5****Art of Nepal and Tibet**

Sp. 5 cl.

Prereq.: 213 or 671 or permission of instructor.

A study and analysis of the major aspects of style, iconography, and historical sequence as found in the arts of Nepal and Tibet. J. Huntington.

**675† U G 5****Art of India III**

Sp.

Prereq.: 213 or permission of instructor.

A survey of architecture and painting after the Muslim conquest with emphasis on intermixture of indigenous and foreign styles.

**677 U G 5****Chinese Art: Buddhist and Pre-Buddhist**

A. 5 cl.

Prereq.: 213 or permission of instructor.

Not open to students with credit for 618.

An analytical study of the Pre-Buddhist and Buddhist art of China documenting both Trans-Asian influences and internal contributions. J. Huntington.

**678 U G 5****Chinese Art: Painting**

W. 3 cl.

Prereq.: 213 or permission of instructor.

An analytical study of the traditional schools of Chinese painting with regard to style, formal development, Chinese aesthetics and intellectual history. J. Huntington.

**680† U G 3****The Art of Japan**

Sp. 3 cl.

Prereq.: 213 or 9 cr. hrs. in Hist. of Art.

Not open to students with credit for 619.

A cultural art history of Japan in terms of monuments, people, and beliefs. J. Huntington.

**693 U G 2-5****Individual Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Advanced study for students in specialized programs.

**694 U G 2-5****Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Group studies for students in specialized programs.

**704 U G 3****Studies in African Art and Archaeology**

A. 3 cl.

Prereq.: 610 or 611.

Repeatable to a maximum of 15 cr. hrs.

Studies in African art emphasizing problem identification, concept organization, library research, and individual criticism. Oditia.

**710 U G 3****Studies in Art Theory and Criticism**

Su, W.

Not open to students with credit for 839.

Repeatable to a maximum of 9 cr. hrs.

Investigations of theories of art and their applications.

**715 U G 3****Research Methods in Art History**

A.

Prereq.: 20 cr. hrs. in hist. of art.

Investigations of source materials, bibliography, concepts, and techniques of research.

**718 U G 5****Studies in Italian Renaissance Art**

A. 5 cl.

Prereq.: 515 or 629 or 630, or permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Selected problems in painting, sculpture, and architecture of Italy in the 14th, 15th, and 16th centuries. Melnikas.

**722 U G 3****Studies in Ancient Greek and Roman Art**

A, Sp. 3 cl.

Prereq.: 622 or 623 or permission of instructor.

Repeatable to a maximum of 9 cr. hrs.

Selected problems in the art of Ancient Greece and Rome, 11th century B.C. to 4th century A.D.

**724 U G 3****Studies in Northern Baroque Art**

Sp. 3 cl.

Prereq.: 631 or Fine Arts 631.

Repeatable to a maximum of 9 cr. hrs.

Selected problems in the painting, sculpture, and architecture of Belgium, Holland, Germany, and France in the 17th and 18th centuries. Herzog.

**725 U G 3****Studies in Italian Baroque Art**

Sp. 3 cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 9 cr. hrs.

Selected problems in the painting, sculpture, and architecture of the 17th century.

**726† U G 3****Studies in Spanish Art**

W. 3 cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 9 cr. hrs.

A selective study of the architecture, sculpture, painting, and minor arts of Spain.

**737 U G 3****Studies in Modern Art**

Su, A. 3 cl.

Prereq.: Either 635, 636, 637, 638, or permission of instructor.

Repeatable to a maximum of 9 cr. hrs.

Selected studies in the art of the United States or modern Europe.

**747 U G 3****Studies in Northern Renaissance Art**

A. 3 cl.

Prereq.: 627 or permission of instructor.

Repeatable to a maximum of 9 cr. hrs.

Selected problems in the art of the Low Countries, Germany, and France from the 14th through the 16th centuries.

**770 U G 5****Studies in Asian Art**

A, W, Sp. 5 cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Introduction to major research problems in Asian art history; specialized bibliography and research directions as applied to selected topics. Huntington.

**H783 U 3-5****Honors Course**

A, W, Sp.

Prereq.: 4th yr. standing with a grade of A in at least half of the Hist. of Art courses taken with an average of B in the remainder; permission of instructor under whose supervision the work is to be completed and the Arts and Sciences Honors Committee. At least 2 qtrs. are required of candidates for the degree B.A. or B.F.A. with distinction in Hist. of Art. Failure to receive a mark of S in this course is a disqualification for special honors.

Repeatable to a maximum of 15 cr. hrs.

A program of study arranged for each student, with individual conferences, reports, and Honors thesis.

**793 U G 2-5****Individual Studies**

A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Advanced study for students in specialized programs.

**804 G 5****Problems in the History of African Art**

Sp.

Prereq.: Permission of instructor.

Research techniques with emphasis on scholarly methods involving extensive search for available source materials on African art. Odita.

**810† G 5****Problems in Art Theory and Criticism**

Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Ludden.

**816 G 3-5****Museum Problems**

Sp.

Repeatable to a maximum of 15 cr. hrs.

An introduction to professional work in museums.

**832 G 2-5****Problems in American Art**

W.

Prereq.: Permission of instructor.

Not open to students with a maximum of 15 cr. hrs. in 932.

Repeatable to a maximum of 15 cr. hrs.

**870† G 5****Problems in Asian Art**

W.

Prereq.: 2 courses in Asian art at the 600 level or permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Advanced studies and specialized research on major topical problems in Asian art.

**Medieval and Renaissance Culture**

(See Medieval and Renaissance Studies 888.)

**Medieval and Renaissance Literature**

(See Medieval and Renaissance Studies 889.)

**917 G 2-5****Seminar in Medieval Art**

Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Ludden.

**920 G 2-5****Seminar in Italian Renaissance Art**

W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Melnikas.

**930 G 2-5****Seminar in Modern Art**

A.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

**993 G 1-5****Individual Studies**

Su, A, W, Sp.

Prereq.: Permission of Department Graduate Chairman.

Repeatable to a maximum of 15 cr. hrs.

Doctoral students may register for individual study in areas not normally covered by courses.

**994 G 1-5****Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Group studies for students in specialized programs.

**999 G Arr.****Research in History of Art**

Su, A, W, Sp.

Research for thesis and dissertation purposes only.

## Home Economics

Office: 229 Campbell Hall, 1787 Neil Avenue

**Professors** N. McCormick (Acting Director), Dickey (Acting Associate Director), Dalrymple, Deacon, Dirks, Firebaugh, Gorman, Heye, Hubbard, Lapitsky, A. McCormick, Sarbaugh, and Taylor; **Associate Professors** Alexander (Assistant Director), Bailey, Bardwell, Bloom, Coveney, Dickerscheid, Everhart, Gritzmacher, Hunt, Meacham, Millican, and Tapscott; **Assistant Professors** Andrian, Bowers, Butler, Chipley, Cremer, Herr, Hock, Honeycutt, Marshall, Mortvedt, Mote, and Roush; **Instructors** Ames, Barber, Crosby, Davies, K. C. Davis, K. S. Davis, Hegland, Henderson, Linhart, Mitchell, Okos, Strom, and White.

The courses in Home Economics may be grouped as follows:

**Family and Child Development**—360, 362, 363, 462, 463, 589.10, 589.12, 593.10, 594.10, 598, 662, 663, 667, 690.10, 793.10, 794.10, 797, 860, 861, 862, 993.10, 998, 999.

**Food and Nutrition**—110, 310, 313, 314, 413, 589.01, 589.02, 593.01, 593.02, 594.01, 594.02, 596, 610, 612, 615, 616, 690.01, 690.02, 711, 793.01, 793.02, 794.01, 794.02, 797, 802, 810, 813, 816, 993.01, 993.02, 998, 999.

**Home Economics Education**—341, 441, 442, 443, 445, 589.09, 589.11, 593.09, 593.11, 594.09, 594.11, 690.09, 690.11, 744, 793.09, 793.11, 794.09, 797, 840, 841, 842, 843, 845, 846, 942, 946, 993.09, 998, 999.

**Management Housing and Equipment**—228, 320, 322, 326, 327, 328, 427, 589.05, 589.06, 589.07, 593.05, 593.06, 593.07, 594.05, 594.06, 594.07, 622, 623, 624, 628, 690.05, 690.06, 690.07, 793.05, 793.06, 793.07, 794.05, 794.06, 794.07, 797, 822, 825, 826, 827, 993.05, 993.06, 993.07, 998, 999.

**Food Service**—230, 430, 431, 435, 589.08, 593.08, 594.08, 630, 632, 633, 634, 635, 690.08, 793.08, 794.08, 797, 830, 832, 993.08, 998, 999.

**Textiles and Clothing**—270, 274, 371, 374, 470, 471, 589.03, 589.04, 593.03, 593.04, 594.03, 594.04, 595, 671, 672, 673, 674, 690.03, 690.04, 793.03, 793.04, 794.03, 794.04, 797, 870, 872, 993.03, 993.04, 998, 999.

**General Courses**—290, 590

**Extension**—593.11, 594.11, 690.11, 793.11, 794.11

### 110 U 5 Elements of Nutrition

A, W, Sp. 5 cl.

Not open to students majoring in home ec. nor students with more than 10 cr. hrs. of chem.

Nutritional needs throughout the life cycle. Herr.

#### GENERAL PREREQUISITES FOR COURSES NUMBERED 200

Unless otherwise indicated, the prerequisites for 200-level courses are 45 cr. hrs. in collegiate courses, exclusive of ROTC and Phys. Ed.; or specified course(s) numbered 100-199.

### 228† U 3 Home Furnishings: Furniture

A. 2 2-hr. cl., 1 2-hr. lab.

Economic factors and trends in materials, construction and finishes; some experience in reconditioning and other techniques. Everhart.

### 230 U 2 Introduction to Food Service Management

W. 2 cl.

Orientation to field of food service management. Cremer and Hubbard.

### 270 U 3 Clothing Selection and Costume Design

A, W, Sp. 2 cl., 1 2-hr. lab.

Prereq.: Art 290 or equiv.

An introduction to costume design with application of aesthetic principles. Strom.

### 274 U 5 Clothing: Construction Techniques and Needlecrafts

W. 2 cl., 3 2-hr. lab.

Prereq.: Major standing in Oc. Ther.

Not open to majors in Home Ec.

Experience in activities of needlecraft and clothing construction which may have therapeutic value. Marshall.

### 290 U 2 Home Economics as a Profession

A, W, Sp. 2 cl.

The nature and status of home economics as a field of study and as a profession. Alexander.

### 294 U 2 or 3 Group Studies

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

- 294.01 Food
- 294.02 Nutrition
- 294.03 Textiles
- 294.04 Clothing
- 294.05 Home Furnishings and Housing
- 294.06 Household Equipment
- 294.07 Home Management and Family Economics
- 294.08 Food Service
- 294.09 Home Economics Education
- 294.10 Family and Child Development
- 294.11 Home Economics Extension
- 294.12 Mental Retardation

#### GENERAL PREREQUISITES FOR COURSES NUMBERED 300 AND 400

Unless otherwise indicated, the prerequisites for 300 and 400-level courses are 90 cr. hrs. in collegiate courses, exclusive of ROTC and Phys. Ed.; or specified courses numbered 100-399.

### 310 U 5 Fundamentals of Nutrition

A, W, Sp. 5 cl.

Prereq.: Chem. 101 and 102 or equiv.

Not open to students with credit for 110 nor to students with 45 cr. hrs. or less.

Basic information in the science of nutrition as applied to man. Mitchell.

### 313 U 3 Food in Different Cultures

A. 3 cl.

Prereq.: 313 or equiv. recommended; 10 cr. hrs. of social science.

Food practices of selected peoples of the world with consideration of the existing social, cultural, and economic conditions. Roush.

**314 U 5****Food**

A, W, Sp. 2 cl., 3 2-hr. lab.

Prereq.: 10 cr. hrs. of chem. and soph. standing.

Application of chemical and physical principles to food preparation and use.

**320 U 3****Housing**

Su, A, W, Sp. 3 cl.

Prereq.: 360 or 10 cr. hrs in social science.

Housing as it affects family living and is in turn affected by family needs, social and economic trends and the physical environment. Coveney and Everhart.

**322 U 5****Household Equipment: Introduction**

Su, A, W, Sp. 4 cl., 1 2-hr. lab.

Prereq.: 10 cr. hrs. of natural science.

Principles involved in the selection, construction, operation, and care of household equipment and their relation to the well-being of the family. Bloom and Coveney.

**326 U 3****The Consumer and the Market**

Su, A, W, Sp. 3 cl.

Prereq.: Econ. 201, and 10 cr. hrs. of social science.

The market from the consumer point of view; relationships of consumption to environmental quality.

**327 U 5****Home Management**

Su, A, W, Sp. 5 cl.

Prereq.: 3rd yr. standing and Econ. 201 or equiv.

Management process of utilizing specific resources for family's well-being. Bowers and Crosby.

**328 U 5****Home Furnishings: Principles**

A, W, Sp. 3 cl., 2 2-hr. lab.

Prereq.: Art 190, 290, or equiv.

Application of art principles to furnishing a home with consideration of aesthetic, economic, and social factors affecting choice. Everhart.

**341 U 3****Introduction to Home Economics Teaching**

A, W, Sp. 2 cl., 1 2-hr. lab.

Prereq.: 2.25 cumulative point-hour ratio; Psych. 230.

Observation in a variety of programs and at different levels. Exploratory teaching experience to determine professional interest and aptitude. Parallel seminar.

**360 U 5****Family Development**

A, W, Sp. 4 cl., 1 hr. arr.

Prereq.: 10 cr. hrs. of social science.

The dynamics of family interaction at each stage of the life cycle; emphasis on developmental tasks, socioeconomic and cultural influences and other family differences. Taylor.

**362 U 4****Introduction to Child Development**

Su, A, W, Sp. 3 cl., 2 consec. hrs. arr. for nursery school observation.

Prereq.: Psychol. 100 or equiv. recommended. Home Ec. major; non-majors with permission only.

Open only to Home Economics majors of sophomore standing or above.

Study of the nature, nurture, and development of children with emphasis on the preschool years.

Blauser and Mote.

**363 U 5****Child Development**

Su, A, W, Sp. 5 cl.

Not open to students with credit for 362.

Developmental patterns of children with emphasis on physical, social, and emotional maturation, especially during the formative years; environmental influences and appropriate guidance. Hegland and Hock.

**371 U 5****Textiles**

A, W, Sp. 4 cl., 1 2-hr. lab.

Prereq.: 10 cr. hrs. of chem. and soph. standing.

Study of the physical and chemical properties of textiles and their components as they relate to care, performance and consumer satisfaction. Butler and Tapscott.

**374 U 5****Clothing: Design Analysis**

A, W, Sp. 2 cl., 6 hrs. lab.

Prereq.: 270, 371, and skill in the basic construction processes.

Adaption of standard patterns to individual proportions, flat pattern designing, and application of principles of design and construction in making garments.

Marshall.

**413 U 4****Foods: Meal Management**

A, W, Sp. 2 cl., 2 3-hr. lab.

Prereq.: 310 and 314.

Nutritional, aesthetic, and social aspects of planning, purchasing, preparing, and serving food to family groups at different income levels. Roush.

**427 U 4****Home Management**

Su, A, W, Sp. 3 cl., lab. hrs. arr.

Prereq.: 327 and senior standing in Home Ec.

Report to Room 166, Campbell Hall, to make application and to check for eligibility at least two qtrs. in advance.

Application and integration of management principles in varying household situations. Crosby.

**430 U 3****Menu Planning for Food Service Establishments**

A. 3 cl.

Prereq.: 230 and 413.

Principles and practices of menu planning for school, industrial, and commercial food units; menus planned for each type of institution.



**431 U 5****Quantity Food Production and Service**

A, Sp. 2 cl., 6 hrs. lab., 2 hrs. arr.

Prereq.: 230, 310, and 314.

Individual experience in application of food preparation principles to quantity production; use and care of large equipment; standardized formulae and costs; service to the public. Cremer.

**435 U 4****Principles of Teaching Applied to Food Service Management**

W. 2 2-hr. cl.

Prereq.: 431, Psychol. 100, and permission of instructor. Principles of education for students whose professional work will require knowledge of techniques for teaching others in non-school situations.

**441 U 5****Principles and Methods of Teaching Applied to Home Economics**

A, W, Sp. 3 cl., ½ day arr.

Prereq.: 40 cr. hrs. in Home Ec.

Consideration of curriculum, methods of teaching, management, and other problems of the home economics teacher.

**442 U 15****Supervised Home Economics Teaching**

A, W, Sp. Full time for 1 qtr. for 15 cr. hrs.

Prereq.: 441, and 55 cr. hrs. in Home Ec. and 2.25 cumulative point-hour ratio 2 qtrs. immediately preceding.

For vocational certification, students must do their teaching in a vocational center.

Registration with the Teacher Placement Service of the College of Education.

Not open to students with credit for 443.

Guided participation in the responsibilities and activities of the Home Economics teacher in the regular day school and extended school program.

**443† U 3****School-Community Problems of the Home Economics Teachers**

Su. 3 cl., arr. hrs. for observation and participation.

Prereq.: 441, 442, and permission of instructor.

For vocational certification only.

Not open to students with credit for 442.

Responsibilities and activities of the home economics teacher in the extended school program with emphasis on adult education, home experience, related home economics teacher activities. Dirks.

**445† U 15****Supervised Teaching in Home Economics Related Occupations**

A, W, Sp. Full time for one quarter.

Prereq.: 341; 45 quarter-hour credits in an area of specialization; 2.25 cumulative point-hour ratio two quarters immediately preceding.

Supervised student teaching in a vocational job training program in the student's area of specialization.

**462 U 3****Nursery School Activities**

Su, A, W, Sp. 3 cl.

Prereq.: 362 or 363; concur. 463.

Application of principles of development to program planning; modification of activities for age level, ability, experience, group and individual needs. Dickerscheid and Davis.

**463 U 2****Nursery School Practicum**

Su, A, W, Sp. 1 conf. hr., 2 2-hr. lab.

Prereq.: 362 and 462.

Repeatable to a maximum of 6 cr. hrs.

Participation in the nursery school as a student teacher apply theory covered in 462. Davis and Mote.

**470 U 3****Clothing: Fashion and the Ready-to-Wear Market**

A, Sp. 5 cl.

Prereq.: 3rd yr. standing.

Fashion, the ready-to-wear market and current developments in the field of textiles and clothing and their relation to satisfying consumer needs. Marshall and Millican.

**471 U 5****Advanced Textiles**

A, Sp. 4 cl., 1 3-hr. lab.

Prereq.: 371 and 3rd yr. standing.

Not open to students with credit for 571.

Advanced study of chemical and physical textile properties; new developments; standards and testing procedures used in evaluation of textiles. Butler and Lapitsky.

**GENERAL PREREQUISITES FOR COURSES  
NUMBERED 500**

Unless otherwise indicated, the prerequisites for 500-level courses are 15 cr. hrs. in courses in the same discipline numbered 200 or higher, or 10 cr. hrs. in courses numbered 200 or higher in the same discipline, plus 10 cr. hrs. in courses numbered 200 or higher in specified allied disciplines; or baccalaureate degree.

**589 U 3, 5 or 15****Field Work in Home Economics**

Su, A, W, Sp.

Prereq.: Senior standing in Home Ec., 2.25 cumulative point-hour ratio, and permission of instructor.

Registration 2 qtrs. before scheduling.

Limited to 5 cr. hrs., except in qtrs. and areas indicated below.

<b>589.01</b>	<b>Foods</b>	<b>3 or 5</b>
<b>589.02</b>	<b>Nutrition</b>	<b>3 or 5</b>
<b>589.03</b>	<b>Textiles</b>	<b>5</b>
<b>589.04</b>	<b>Clothing</b>	<b>15</b>
<b>589.05</b>	<b>Home Furnishings and Housing</b>	<b>3 or 5</b>
<b>589.06</b>	<b>Household Equipment</b>	<b>5</b>
<b>589.07</b>	<b>Home Management and Family Economics</b>	<b>3 or 5</b>
<b>589.08</b>	<b>Food Service</b>	<b>3 or 5</b>
<b>589.09</b>	<b>Home Economics Education</b>	<b>3 or 5</b>
<b>589.10</b>	<b>Family and Child Development</b>	<b>3 or 5</b>
<b>589.11</b>	<b>Home Economics Extension</b>	<b>3, 5, or 15</b>
<b>589.12</b>	<b>Mental Retardation</b>	<b>3 or 5</b>

**H590 U 3****Home Economics Colloquia**

A. 3 cl.

Prereq.: Eligibility for Honors Program in Home Ec.

Repeatable to a maximum of 9 cr. hrs.

Subjects will be oriented in different quarters to natural science, social science, and general home economics topics.

**593 U 2, 3 or 5****Individual Studies**

Su, A, W, Sp. 1 or more conf.

H593 (Honors) may be available to students enrolled in a College Honors Program or eligible for enrollment.

Prereq.: Minimum of 6 cr. hrs. in subject matter of problem with cumulative point-hour ratio of 2.7 in Home Ec. subjects and permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

**593.01 Food****593.02 Nutrition****593.03 Textiles****593.04 Clothing****593.05 Home Furnishings and Housing****593.06 Household Equipment****593.07 Home Management and Family Economics****593.08 Food Service****593.09 Home Economics Education****593.10 Family and Child Development****593.11 Home Economics Extension****594 U 2, 3, or 5****Group Studies**

Su, A, W, Sp. 3 cl.

Repeatable to a maximum of 10 cr. hrs.

**594.01 Food****594.02 Nutrition****594.03 Textiles****594.04 Clothing****594.05 Home Furnishings and Housing****594.06 Household Equipment****594.07 Home Management and Family Economics****594.08 Food Service****594.09 Home Economics Education****594.10 Family and Child Development****594.11 Home Economics Extension****594.12 Mental Retardation****595 U 2****Textiles and Clothing Seminar**

W, Sp. 2 cl.

Prereq.: 4th yr. standing, and major in textiles and clothing.

Special reports and readings in textiles and clothing which contribute to professional effectiveness and promote integration of information in the two fields.

**596 U 2****Food and Nutrition Seminar**

Sp. 2 cl.

Prereq.: 4th yr. standing, and major in food and nutrition.

Reports based on current research, recent summaries and articles which give perspective in food and nutrition.

**598 U 2****Seminar in Child Development**

W. 1 cl.

Prereq.: 360 and 362.

Review, interpretation, and evaluation of current literature and research in defined areas, with emphasis on recommended professional standards in group care of children.

**GENERAL PREREQUISITES FOR COURSES  
NUMBERED 600**

Unless otherwise indicated, the prerequisites for 600-level courses are 15 cr. hrs. in courses in the same discipline numbered 300 or higher, or 10 cr. hrs. in courses numbered 300 or higher in the same discipline, plus 10 cr. hrs. in courses numbered 300 or higher in specified allied disciplines.

**610 U G 5****Nutrition**

W. 5 cl.

Prereq.: 310, Zool. 232, and Biochem. 511.

Modern concepts of normal nutrition.

**612 U G 3****Nutrition: Diet Therapy**

Sp. 3 cl., other hrs. arr.

Prereq.: 610 or equiv.

Modern concepts of clinical nutrition and abnormalities treated by modification of the diet.

**615 U G 5****Experimental Work in Food Preparation**

A, Sp. 3 cl., 2 3-hr. lab.

Prereq.: 314, and Chem. 231 or Biochem. 511.

Application of experimental methods to problems involved in preparation of foods.

**616 U G 3****Nutrition of Infants and Children**

Sp. 3 cl.

Prereq.: 610.

Needs of children for good nutrition from the embryonic stage through adolescence.

**622 U G 5****Household Equipment: Performance Testing**

A, W. 2 cl., 3 2-hr. lab.

Prereq.: 314 and 322.

Experimental problems on the performance of the major types of household equipment used in the preparation of food. Hunt.

**623 U G 5****Household Equipment: Performance Testing**

A. 4 cl., 4-hr. lab. arr.

Prereq.: 322, 371, or equiv., 4th yr. standing, and permission of instructor.

Experience in the techniques and reporting of experimental investigations dealing with household equipment used in laundering and other cleaning processes. Coveney.

**624 U G 5****Household Equipment:  
The Home Economist in Business**

Sp. 2 cl., 3 2-hr. lab.

Prereq.: 622, 5 cr. hrs. in speech communication. Demonstrations and evaluations of procedures; qualifications for meeting professional requirements of the home economist in business related to household equipment. Bloom.

**628 U G 3****Selection of Furnishings for the Home**

Sp. 2 cl., 1 2-hr. lab. Field trips arr.

Prereq.: 327, 328, and 371.

Influences on today's homes of American, English, and French interiors, including furniture, backgrounds, and accessories.

**630 U G 5****Selection of Food and Equipment for Institutions**

W. 5 cl.

Prereq.: 431 or concur. and Econ. 201.

Principles and standards for selection of food, equipment, and furnishings in institution food service, arrangement and layout. Cremer.

**632 U G 5****Institution Organization and Management**

Sp. 3 cl., 6 hrs. lab. arr.

Prereq.: 431, 630 and Bus. Admin. 500.

Principles of business organization and management and principles of learning applied to the management of food service operations; supervised experience in meal management.

**635† U G 3****Food Cost Analysis for Institutions**

A. 2 2-hr. cl.

Prereq.: 431 and Bus. Admin. 500.

Factors and procedures involved in controlling food and house department costs; evaluation of data from records and reports.

**662 U G 3****Child Development**

Su, W. 2 cl., 2 hrs. arr.

Prereq.: 362, Psychol. 550, and Soc. 434.

Growth and development of children from six through adolescence with emphasis on maturation patterns and individual differences.

**663 U G 3****Infant Guidance and Care**

A, Sp. 2 cl., 1 2-hr. lab. arr.

Prereq.: 362, Psychol. 550, and Soc. 434.

Pattern of development during infancy and the second year of life, and responsibilities of adults for providing a home environment favoring optimum development. Dickerscheid and Hock.

**667 U G 3****Administration of Day Care Centers**

Su, A. 3 cl.

Prereq.: 462, 463, or equiv., and permission of instructor.

Program planning to meet developmental level and needs of young children; minimum and recommended standards. Heye.

**671 U G 3****Textiles: Technology**

Su, W. 1 cl., 2 2-hr. lab.

Prereq.: 471.

Experience in planning and conducting textile tests and in evaluating resulting data; development, present status, and importance of textile testing. Butler.

**672 U G 5****History of Costume and Textiles**

A, W. 5 cl.

Prereq.: 471.

A chronological study of costume and textiles from ancient civilization to modern times, with consideration of cultural forces that affected the development. Millican.

**673 U G 5****Clothing**

Su, A, W, Sp. 2 cl., 6 hrs. lab.

Prereq.: 374.

Not open to students with credit for 574.

Evaluation and application of design and fashion principles in relation to tailored garments; quality-price relationship; optimum utilization of materials and resources. Millican.

**674 U G 5****Clothing: Advanced Design Analysis**

Su, A, W, Sp. 2 cl., 3 2-hr. lab.

Prereq.: 374 or equiv.

Creative interpretation of dress design terminating in finished garments developed through the media of flat pattern and draping.

**690 U G 4****Home Economics Workshop**

Su. Full time for 3 wks.

Prereq.: Permission of instructor.

Repeatable to a maximum of 12 cr. hrs.

Workshops in the following phases:

- 690.01 Foods
- 690.02 Nutrition
- 690.03 Textiles
- 690.04 Clothing
- 690.05 Home Furnishings and Housing
- 690.06 Household Equipment
- 690.07 Home Management and Family Economics
- 690.08 Food Service
- 690.09 Home Economics Education
- 690.10 Family and Child Development
- 690.11 Home Economics Extension

**GENERAL PREREQUISITES FOR COURSES  
NUMBERED 700**

Unless otherwise indicated, the prerequisites for 700-level courses are 15 cr. hrs. in courses in the same discipline numbered 400 or higher, plus additional specified courses numbered 600 or higher.

**711 U G 3****Nutrition: History**

W. 3 cl.

Prereq.: 610 and permission of instructor.

Persons, discoveries, and methods in the evolution of nutrition as a science and a factor in the control of human welfare. Vivian.

**744 U G 3****Evaluation in Home Economics**

Sp. 3 cl.

Not open to students with credit for 844.

Procedure for appraising student progress in the attainment of objectives, construction of evaluation instruments, analysis, and interpretation of data from evaluation programs.

**793 U G 2, 3, or 5****Individual Studies**

Su, A, W, Sp. One or more confs.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

- 793.01 Food
- 793.02 Nutrition and Dietetics
- 793.03 Textiles
- 793.04 Clothing
- 793.05 Home Furnishings and Housing
- 793.06 Household Equipment
- 793.07 Home Management and Family Economics
- 793.08 Food Service
- 793.09 Home Economics Education
- 793.10 Family and Child Development
- 793.11 Home Economics Extension

**794 U G 2, 3 or 5****Group Studies**

Su, A, W, Sp. 3 cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

- 794.01 Food
- 794.02 Nutrition
- 794.03 Textiles
- 794.04 Clothing
- 794.05 Home Furnishings and Housing
- 794.06 Household Equipment
- 794.07 Home Management and Family Economics
- 794.08 Food Service
- 794.09 Home Economics Education
- 794.10 Family and Child Development
- 794.11 Home Economics Extension

**797 U G 2-4****Interdepartmental Seminar**

Su, A, W, Sp.

Repeatable to a maximum of 6 cr. hrs.

(See under Interdepartmental Seminars.)

- a. Interdisciplinary approach to mental retardation.

**GENERAL PREREQUISITES FOR COURSES NUMBERED 800 AND 900**

Unless otherwise indicated, the prerequisites for 800 and 900-level courses are 30 cr. hrs. in courses in the same discipline, or 20 cr. hrs. in the same discipline, plus 25 cr. hrs. in specified allied disciplines.

**802 G 3 or 5****Seminar in Foods and Nutrition**

Su, A, W, Sp.

Prereq.: 610 or 615 and permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

- a. Research Methods in Food and Nutrition—Su.
- b. Energy Metabolism—Su.

Hubbard and Vivian.

**810 G 3****Research Methods in Nutrition**

A. 3 cl.

Prereq.: 610, Biochem. 511, and Zool. 232.

Organization, methods, analysis of data and reporting projects in nutrition research. Vivian.

**813† G 3****Introductory Food Research**

Su, Sp. 1 cl., 2 3-hr. lab.

Prereq.: 615 and Biochem. 511 or equiv.

Individual investigations in food preparation, processing in the home and food storage carried out in laboratory, analyzed and reported.

**816† G 3****Recent Developments in Food and Nutrition Research**

Sp. 3 cl.

Prereq.: Biochem. 511 or equiv.

Brief survey of recent research.

**822 G 3 or 5****Seminar in Management, Housing, and Equipment**

Sp. 3 cl.

Prereq.: 30 cr. hrs. in Home Ec., including 622 or 623 or 825 or 826 depending on emphasis of topic, and permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

- a. Home furnishings and Housing.
  - b. Home Management.
  - c. Household Equipment.
  - d. Consumer and Market.
- Deacon.

**825 G 3****Home Management: Activity Analysis**

Sp. 2 cl.

Prereq.: 10 cr. hrs. in home management and household equipment or equiv.

Advanced study in application of work principles to design of appliances, work space areas, and methods of work in the home. Firebaugh.

**826 G 3****Family Economic Resources and Functions**

W. 3 cl.

Prereq.: 326 or equiv.

Principles, major problems, and trends in the economics of the family. Deacon.

**827 G 3****Home Management: Development and Theory**

A. 3 cl.

Prereq.: 327.

Historical development and present trends in home management with emphasis on theory and practices. Deacon.

**830 G 3 or 5****Trends in Food Service Management**

W. 3 cl.

Prereq.: 20 cr. hrs. in quantity food production, organization and management, experience in food service management or administrative dietetics.

Interpretation of principles and current research in relation to management of food service organizations at the policy-making level. Hubbard.

**832 G 3 or 5****Seminar in Food Service Management**

Su. 1-2 cl.

Prereq.: Graduate standing in Home Ec. and permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Topics to be announced.

Hubbard.

**840 G 3****Research Methods in Home Economics**

Su, A. 3 cl.

Prereq.: Master's degree in home ec.

Nature of research in various areas of the field; criteria for setting up a research problem; techniques for collecting and analyzing data. Dalrymple.

**841 G 3****Home Economics in American Education**

A. 3 cl.

Prereq.: 441 or equiv. and permission of instructor.

An overview of home economics at the elementary, secondary, higher education and adult levels; general trends in enrollment, curriculum and guidance, supervision, administration and research.

**842 G 3****Home Economics in Higher Education**

W. 3 cl.

Prereq.: 841 or equiv.

Present status and function of home economics at the college level; problems in curriculum development; criteria for effective teaching, guidance, and testing procedures.

**843 G 3 or 5****Seminar in Home Economics Education**

W. 1-2 cl.

Prereq.: Grad. standing in Home Ec. and permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

- a. Research in Home Economics. Su.
- b. Administration in Home Economics. Sp.\*

**845 G 3****Supervision of Home Economics Teaching**

Su, A. 3 cl.

Prereq.: 846.

For experienced teachers of home economics who are interested in supervising student teachers or in working with home economics teachers in service.

**846 G 3****The Teaching of Home Economics**

Sp. 3 cl.

Prereq.: 841 or equiv. and permission of instructor.

Home economics in integrated, core, experimental, and other special types of programs.

**860 G 3****The Family: The Early Years**

Su, A. 2 1/2-hr. cl.

Prereq.: 25 cr. hrs. in sociol. and psychol., or equiv.

Relationships and adjustments in family living with emphasis on the early and expanding stages of the family life cycle. Taylor.

**861 G 3****The Family: Middle and Later Years**

Su, Sp. 3 cl.

Prereq.: 860.

The interrelationship and adjustment of families with emphasis on the middle and later years of the life cycle. Taylor.

**862 G 3 or 5****Seminar in Family and Child Development**

Su, A, W, Sp. 1-3 cl.

Prereq.: Grad. standing in Home Ec. and permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

- a. Parent-Child Relationships. W.\*
- b. Learning. Theory and Its Relationship to Nursery Education. Sp.

**870 G 5****Clothing: Fashion**

Su, Sp. 3 cl. plus independent study.

Prereq.: 672 and 25 cr. hrs. in courses in Sociol., Psychol., Econ., or Bus. Admin.

Fashion as a social and economic force—its influence on production, distribution, and consumption of textiles and clothing. Dickey.

**872 G 3 or 5****Seminar in Textiles and Clothing**

Su, A, W, Sp. 2-3 cl.

Prereq.: 672 and 870 or 671, or 842 and Ed. 845, depending on emphasis of topic and permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

- a. Economics of Textiles. W.
- b. Social-Psychological Aspect of Clothing. Su.
- c. Educational Trends in Textiles and Clothing. A.
- d. Historic Textiles. Sp.

Dickey, Lapitsky, and Meacham.

**898 G 1****Interdepartmental Seminar in Nutrition and Food Technology**

Sp.

(See under Interdepartmental Seminars.)

**899 G 1-5****Interdepartmental Seminar**

A, W, Sp.

(See under Interdepartmental Seminars.)

**942 G 3****Administration in Home Economics**

Sp. 3 cl.

Prereq.: M.S. degree in Home Ec.

Principles, trends, problems, and evaluative criteria related to home economics units in higher education administrative structure; functions, responsibilities, qualifications of home economics administrative personnel. Dalrymple.

**946† G 3****Program Analysis and Design in Home Economics**

Su. 3 cl.

Prereq.: 846 or permission of instructor.

Theoretical approach to program development; innovation and experimentation in program design in home economics at different levels; analysis and restructuring of existing programs; climate and strategies for change. Dirks.

### 993 G 2, 3 or 5

#### Individual Studies

Su, A, W, Sp. 1 or more confs.

Repeatable to a maximum of 15 cr. hrs.

Prereq.: Permission of instructor.

Problems in various phases of home economics chosen for individual study.

- 993.01 Food
- 993.02 Nutrition and Dietetics
- 993.03 Textiles
- 993.04 Clothing
- 993.05 Home Furnishings and Housing
- 993.06 Household Equipment
- 993.07 Home Management and Family Economics
- 993.08 Food Service
- 993.09 Home Economics Education
- 993.10 Family and Child Development

### 998 G Arr.

#### Research: Thesis

Su, A, W, Sp.

Research for master's thesis.

### 999 G Arr.

#### Research: Dissertation

Su, A, W, Sp.

Research for thesis or dissertation purposes only.

## Horticulture

Office: 152 Howlett Hall, 2001 Fyffe Court

**Professors** Rollins (Chairman), Alban, Beattie, Cahoon, Caldwell, Gallander, Geisman, Gould, Hartman, Hill (Associate Chairman, Wooster), Kawase, Kiplinger, Kretchman, Reisch, Tayama, and Wittmeyer; **Associate Professors** Berry, Brooks, George, Kozel, and Peng; **Assistant Professors** Crean, D. Ferree, M. Ferree, Fretz, McDowell, Mosley, Smith, Staby, Sydnor, and Utzinger.

### 111 U 3

#### Introduction to Landscape Horticulture

A, Sp. 2 cl., 1-hr. lab.

Value of landscape horticulture to the individual and community including culture, identification, and use of plants in planting design. Kozel.

#### GENERAL PREREQUISITES FOR COURSES NUMBERED 200

Unless otherwise indicated, the prerequisites for 200-level courses are 45 cr. hrs. in collegiate courses, exclusive of ROTC and Phys. Ed.

#### Plant Science in Agriculture

(See Agron. 200)

(Offered in cooperation with the Dept. of Hort.)

### 202 U 3

#### Fruits and Vegetables for Man

A. 3 1-hr. cl.

Introductory course emphasizing application and appreciation of fruits and vegetables, including origins, pruning and training, and growing practices with commercial systems contrasted with backyard gardening. George.

### 203 U 3

#### Horticultural Morphology

A, Sp. 3 cl.

A study of horticultural plant materials emphasizing the interpretation of gross plant structures and their development in relation to cultural practices and the environment. Hartman.

### 231 U 3

#### Landscape Plants I

A. 2 1-hr. cl., 1 2-hr. lab.

Prereq.: Bot. 102.

Not open to Landscape Horticulture majors.

A laboratory, field, and discussion course studying trees, shrubs, vines, and ground covers used in landscape plantings.

### 232 U 3

#### Landscape Maintenance

W. 3 1-hr. cl.

Prereq.: 231.

Not open to Landscape Horticulture majors.

Management of landscape plantings with special emphasis on transplanting, mulching, nutrition, pest control, pruning, physiological disorders, and diagnosing plant problems.

### 233 U 3

#### Landscape Plants II

Sp. 2 1-hr. cl., 1 2-hr. lab.

Prereq.: 232.

Not open to Landscape Horticulture majors.

Landscape characteristics and qualities of selected woody plants, their use, seasonal interest, and environmental suitability.

### 241 U 3

#### Food Preservation

Sp. 3 cl.

Introduction to the food processing industry; principles involved in the modern methods of assembling, processing, and distribution of food. Gould.

### 293 U 2, 3, or 5

#### Individual Studies

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

Individual studies in areas of fruit, vegetable, and florist crops; landscape horticulture; and processing and technology.

### 294 U 2, 3, or 5

#### Group Studies

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

Special group studies in areas of fruit, vegetable, and florist crops; landscape horticulture; processing and technology.

#### H299 U 5

##### Plants and Man

W. 4 cl., assigned reading 1 hr.

Prereq.: 5 cr. hrs. Biological Sciences and membership in a College Honors Program or eligibility for membership in a College Honors Program.

Not open to students with credit for Agron. 200.

The influence and interaction of limiting factors on plant growth with emphasis on principles utilized by man to increase productivity and value of plant products. Geisman and Herr.

#### GENERAL PREREQUISITES FOR COURSES NUMBERED 300 AND 400

Unless otherwise indicated, the prerequisites for 300 and 400-level courses are 90 cr. hrs. in collegiate courses, exclusive of ROTC and Phys. Ed.; or specified courses numbered 100-399.

#### 431 U 5

##### Landscape Horticulture I—Herbaceous Plants

Sp. 3 cl., 2 2-hr. lab.

Prereq.: 203 and Bot. 102.

The identification, culture and landscape use of bulbs, annuals, herbaceous perennials, and garden roses; identification of lawn grasses and turf management are also covered. McDowell.

#### 432 U 5

##### Landscape Horticulture II— Woody Deciduous Plants

A, Sp. 3 cl., 2 2-hr. lab.

Prereq.: 203 and Bot. 102.

A detailed study of deciduous trees, shrubs and vines, their identification, growth habits, culture, adaptation to environmental conditions, uses, combinations, and management in landscape plantings. Kozel.

#### 433 U 5

##### Landscape Horticulture III— Woody Evergreen Plants

A, W. 3 cl., 2 2-hr. labs.

Prereq.: 432.

Detailed study of narrow and broadleaf evergreens, their identification, growth habits, culture, uses, and management in landscape plantings; winter characteristics of deciduous plants reviewed. Kozel.

#### 434 U 5

##### Landscape Horticulture IV—Woody Plants

Sp. 3 cl., 2 2-hr. labs.

Prereq.: 432 and 433.

Woody plant use for specific landscape function and unusual environment situations; aesthetic features of plants are studied in detail with emphasis on selected major genera. Kozel.

#### 441 U 5

##### Processing of Fruit and Vegetable Products

W. 3 cl., 2 2-hr. labs.

Prereq.: Chem. 102 or 122.

Fundamentals essential to commercial processing and utilization of fruits, vegetables, and related food products. Gould.

#### 442 U 5

##### Quality Attributes of Fruits, Vegetables, and Related Foods

Sp. 3 cl., 2 2-hr. labs.

Prereq.: Chem. 102 or 122.

Identifying, evaluating, and controlling quality attributes of fresh and processed fruits, vegetables, and related products as to consumer acceptance, nutrition, and use. Gould.

#### 450 U 5

##### Principles of Vegetable Crop Production

W. 4 cl., 2-hr. lab.

Prereq.: 203.

The production and utilization of vegetable crops, including potatoes, with emphasis on environmental factors which influence growing and handling of these crops. Alban.

#### 461 U 5

##### Principles of Tree Fruit Production

A. 4 cl., 2-hr. lab.

Prereq.: 203 or equiv.

A study of the fundamental principles of pome and stone fruit production with emphasis on recognition and solution of problems according to modern scientific concepts. Hartman.

#### 462 U 5

##### Principles of Small Fruit Production

W. 4 cl., 2-hr. lab.

Prereq.: 203.

A study of small fruit production with emphasis on the recent biological advances from which this technology has evolved. Hartman.

#### 489 U 2

##### Horticultural Industries Experience

Su, A, W, Sp.

Prereq.: Major standing in Hort.

Repeatable to a maximum of 4 cr. hrs.

Required for two qtrs. for students majoring in Land. Hort. under Agr. Ind. degree program.

Ten weeks of planned and supervised practical experience in an approved horticultural enterprise, including completion of a special problem with a written report.

#### GENERAL PREREQUISITES FOR COURSES NUMBERED 500

Unless otherwise indicated, the prerequisites for 500-level courses are 15 cr. hrs. in courses in the same discipline numbered 200 or higher, or 10 cr. hrs. in courses numbered 200 or higher in the same discipline, plus 10 cr. hrs. in courses numbered 200 or higher in specified allied disciplines; or baccalaureate degree.

#### 515 U 5

##### Plant Propagation

Sp. 4 cl., 1 2-hr. lab.

Prereq.: 203, 431, 432, and Bot. 102.

Not open to students with credit for 415.

Study of the principles and commercial practices involved in the sexual and asexual propagation of horticultural plants; facilities, equipment, and pathogen-free stock are considered. McDowell.

**593 U 2, 3 or 5****Individual Studies**

Su, A, W, Sp.

Prereq.: Senior standing in Hort.

Special studies in the fields of fruit crops, vegetable crops, florist crops, landscape horticulture, and processing and technology of fruits, vegetables, and related crops.

**594 U G 2, 3, or 5****Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

Special group studies in the fields of fruit, vegetable and florist crops; landscape horticulture; and processing and technology.

**H599 U 2, 3 or 5****Honors Course**

A, W, Sp.

Prereq.: Honors Program.

Special studies in the fields of fruit crops, vegetable crops, florist crops, landscape horticulture, and processing and technology of fruits, vegetables, and related products.

**GENERAL PREREQUISITES FOR COURSES  
NUMBERED 600**

Unless otherwise indicated, the prerequisites for 600-level courses are 15 cr. hrs. in courses in the same discipline numbered 300 or higher, or 10 cr. hrs. in courses numbered 300 or higher in the same discipline, plus 10 cr. hrs. in courses numbered 300 or higher in specified allied disciplines.

**601 U G 3****Horticultural Plant Breeding**

W. 2 cl., 1 2-hr. lab.

Prereq.: 450, 461, or 621, and Biol. 100.

Plant breeding methods and genetic principles applied to horticultural plant improvement, including fundamentals of seed production, variety evaluation, certification, and maintenance. George.

**609 U G 5****The Post-Harvest Physiology  
of Horticultural Crops**

A. 3 lec., 2-hr. lab., 1-hr. assigned reading.

Prereq.: Bot. 431.

The basic principles of post-harvest physiology, handling, and storage, of fruits, vegetables, ornamentals, and flowers are stressed along with operation techniques of modern storages. Kretchman.

**610 U G 3****Weed Control in Horticultural Crops**

Sp. 3 cl.

Prereq.: 15 cr. hr. Hort. and 10 cr. hrs. Bot.

A study of environmental and cultural factors which influence weed development in horticultural crops and a review of the principles of chemical and mechanical weed control. Alban.

**611 U G 5****Tropical and Subtropical Fruit  
and Vegetable Production**

A. 4 cl., 2-hr. lab.

Prereq.: Senior or graduate standing, minimum of 20 cr. hrs. Biological Sciences, and Agron. 543.

A study of important tropical and subtropical fruits and vegetables, with emphasis on latest technological advances to achieve optimum quantitative and qualitative yields. Hartman and Alban.

**621 U G 5****Greenhouse Environment Control**

A. 4 cl., 1 3-hr. lab.

Prereq.: 515; Prereq. or concur. Bot. 430.

Not open to students with credit for 422.

Principles and practices of greenhouse and growth chamber operation including construction, heating, cooling, light, photoperiodism, temperature, humidity, ventilation, moisture, soils, nutrition, and pests. Kiplinger.

**622 U G 5****Commercial Floriculture I—Potted Plants**

W. 4 cl., 1 3-hr. lab.

Prereq.: 621 and Bot. 430; prereq. or concur. Bot. 431.

Physiological principles and environmental factors in production of azaleas, begonias, bulbs, chrysanthemums, cyclamen, geraniums, hydrangeas, poinsettias, roses, saintpaulias, and other potted flowering and foliage plants. Kiplinger.

**623 U G 5****Commercial Floriculture II—Cut Flowers**

Sp. 4 cl., 1 3-hr. lab.

Prereq.: 621 and Bot. 430; prereq. or concur. Bot. 431.

Physiological principles and environmental factors in production of asters, carnations, chrysanthemums, orchids, roses, snapdragons and other cut flower crops; analysis of production costs of crops. Kiplinger.

**624 U G 5****Commercial Floriculture III—  
Design and Marketing**

Sp. 3 cl., 2 2-hr. labs.

Prereq.: 621 and Econ. 201.

Fundamentals of commercial floral design; flower shop management; principles and practices in handling, packaging, and selling florists' crops and supplies through wholesale and retail outlets. Kiplinger.

**641 U G 5****Unit Operations in Processing Fruits,  
Vegetables, and Related Foods I**

Su. 3 cl., 2 3-hr. labs.

Prereq.: 441.

Unit processes of handling, grading, cleaning, sorting, peeling, pumping, change in form, and filling as related to commercial processing of fruits, vegetables, and related products. Gould.

**642 U G 5****Unit Operations in Processing Fruits,  
Vegetables, and Related Foods II**

A. 3 cl., 2 2-hr. labs.

Prereq.: 441.

Unit processes of extracting, filtering, and emulsifying, carbonating, gassing, enrobing, compounding, forming, and fortifying as related to food manufacture. Crean.

**643 U G 5****Unit Operation in Processing Fruits,  
Vegetables, and Related Foods III**

Sp. 3 cl., 2 2-hr. lab.

Prereq.: 441.



Unit processes of milling, grinding, toasting, extruding, frying, and formulating as related to the commercial processing of potatoes, cereal strains, and related foods. Peng.

**644 U G 5**  
**Analysis of Fruits, Vegetables and Related Products**

Sp. 2 1-hr. cl., 3 2-hr. lab.  
 Prereq.: 442 and Chem. 102.

Fundamental principles and techniques of chemical analysis of fruits, vegetables, and products derived from them. Crean.

**650 U G 5**  
**Greenhouse Vegetable Crops**

A. 3 cl., 4 lab. hrs.  
 Prereq.: 621.

A study of the origin and development of the vegetable forcing industry and present-day cultural practices with reference to the more important greenhouse vegetable crops. Alban.

**652 U G 5**  
**Advanced Vegetable Crops**

Sp. 4 cl., 1 2-hr. lab.  
 Prereq.: 450.

The culture of the principal vegetable crops, including history, plant characteristics, physiology, propagation, climatic and edaphic adaptations, and specialized production technology.

**690 U G 2**  
**Colloquia**

A, W, Sp.  
 Prereq.: Senior standing.  
 Topic to be announced.

**694 U G 2, 3 or 5**  
**Group Studies**

A, W, Sp.  
 Prereq.: Senior or grad. standing.  
 Special group studies in the fields of fruit crops, vegetable crops, florist crops, landscape horticulture, and processing and technology.

**699 U G 2**  
**Junior Seminar**

A, W, Sp.  
 Review and interpretation of research literature.

**GENERAL PREREQUISITES FOR COURSES  
 NUMBERED 700**

Unless otherwise indicated, the prerequisites for 700-level courses are 15 cr. hrs. in courses in the same discipline numbered 400 or higher, plus additional specified course(s) numbered 600 or higher.

**731 U G 5**  
**Arboriculture**

A. 4 cl., 1 3-hr. lab.  
 Prereq.: 432 and Bot. 431.  
 Environmental factors affecting plant growth and the planting, fertilization, pruning, cabling, and diagnosis of disorders in commercial arboriculture, city forestry, park, and industrial grounds maintenance.

**733 U G 5**  
**Management of Nursery and Garden Store Operations**

Sp. 4 cl., 3-hr. lab.  
 Prereq.: 433, 621, and Agron. 240.  
 Detailed consideration of factors involved in site selection and operation of commercial nurseries and garden centers; production and marketing of ornamental plants and related products.

**734 U G 5**  
**Physiology of Ornamental Plants**

W. 4 cl., 3-hr. lab.  
 Prereq.: 733 and Bot. 431 or permission of instructor.  
 Influence and interaction of endogenous and exogenous factors on growth and development of ornamental plants. Kozel.

**741 U G 5**  
**Food Regulations and Product Examination**

W. 3 cl., 2 2-hr. labs.  
 Prereq.: 241 and 442.  
 Food laws, regulations, grade standards, and the technical control of processed foods; interpretation of laboratory analysis for control of product quality. Gould.

**794 U G 2**  
**Group Studies in the Processing of Fruits, Vegetables, and Related Food Products**

Prereq.: 641, 642, and 741.  
 Repeatable by undergraduates to a maximum of 8 cr. hrs.  
 a. Plant Sanitation and Waste Disposal. Su. Gould.  
 b. Processing Methodology. A. Peng.  
 c. Packaging Materials and Methodology. W. Geisman.  
 d. Color Evaluation and Advanced Quality Control. Sp. Gould.

**GENERAL PREREQUISITES FOR COURSES  
 NUMBERED 800 AND 900**

Unless otherwise indicated, the prerequisites for 800 and 900-level courses are 30 cr. hrs. in courses in the same discipline, or 20 cr. hrs. in the same discipline, plus 25 cr. hrs. in specified allied disciplines.

**801 G 2 or 3**  
**Advanced Studies in Horticultural Science**

A, W, Sp.  
 Prereq.: Permission of instructor.  
 a. Morphological and anatomical studies of flowering and fruiting. Sp. Hartman.  
 b. Morphological and anatomical studies of vegetative plant parts as influenced by environment. W. Hartman.  
 c. Post-harvest physiology of horticultural crops and plants. A. Kretchman.  
 d. Advanced vegetable physiology. A. Alban.  
 e. Advanced horticultural crop breeding. Sp. George.  
 f. Fruit and vegetable processing and specialty products. A. Gould.  
 g. Quality control in fruit and vegetable processing. Sp. Gould.  
 h. Physiological studies in floriculture crops. A. Kiplinger.  
 i. Microclimates in landscape plantings. Sp. Kozel.

804 G 2

**Seminar**

A, W.

805\* G 4

**Seminar in the Historical Literature and Current Developments of Horticulture**

A.

Prereq.: 461, 652, 622, or 731.

History and literature of horticulture from the 8th Century B.C. to the present; developments during the 20th Century emphasized; current trends appraised.

811 G 5

**Advanced Plant Nutrition I—Macro-nutrients**

A. 3 cl., 4 lab. hrs.

Prereq.: Bot. 631 or equiv.

Effect of major nutrient elements exclusive of calcium upon development of horticultural plants; physiological and biochemical changes occurring within plants and diagnosing deficiencies and excesses. Crean.

812 G 5

**Advanced Plant Nutrition II—Micro-nutrients**

W. 2 cl., 2 2-hr. labs., assigned reading 1 hr.

Prereq.: Bot. 631 or equiv.

Effects of deficiencies and excesses of calcium and micro-nutrients upon growth and development of horticultural plants including techniques of detecting and correcting such condition. Crean.

897 G 1

**Interdepartmental Seminar in Natural Resources**

A, W, Sp.

(See under Interdepartmental Seminars.)

898 G 1

**Interdepartmental Seminar in Nutrition and Food Technology**

Sp.

(See under Interdepartmental Seminars.)

993 G 2, 3 or 5

**Individual Studies**

Su, A, W, Sp.

Special studies in the fields of fruit crops, vegetable crops, florist crops, landscape horticulture, and processing and technology of fruits, vegetables, and related food products.

999 G Arr.

**Research Thesis or Dissertation**

Su, A, W, Sp.

Research for thesis or dissertation purposes only.

## Hospital Administration

(School of Allied Medical Professions)

Office: 543 School of Allied Medical Professions Building, 1583 Perry Street

**Assistant Professors** Johnson (Division Director) and Loeb (Associate Director); **Professors** Keller and Meiling; **Clinical Associate Professor** Lentz; **Assistant Professors** Caswell and Westra; **Clinical Assistant Professor** Hughes; **Instructors** Butts, Howe, Lash, Rosenberg, and Sims; **Clinical Instructors** Andrews, Ayers, Carson, Channing, Farrington, Gemma, Housley, Kline, Kresheck, Mansfield, Newkirk, Pierson, Saathoff, and Turner.

800 G 3

**Medical Care Organization I**

A. 3 cl.

Prereq.: Permission of instructor.

Analysis of arrangements for the organization, financing, and delivery of medical care services. Loeb.

801. G 3

**Medical Care Organization II**

W. 3 cl.

Prereq.: 800.

Issues and problems in medical care organization, with special emphasis on the social, economic, and political environment of the health care delivery system. Loeb.

802 G 3

**Economic Analysis of Health Services**

W. 3 cl.

Prereq.: Permission of instructor.

Not open to students with credit for 828.

Applications of economic analysis to health services, with emphasis on the microeconomic behavior of decision units in the health sector. Caswell.

810 G 3

**Hospital Organization and Management**

3 cl.

Not open to students with credit for 829.

Application of organizational theory to health institutions; examination and analysis of the hospital organization in its various forms; consideration of management problems involving departmentalization. Price.

**810.01 The Hospital Management Process**

A.

Prereq.: Permission of instructor.

Johnson.

**810.02 Analysis and Control**

W.

Prereq.: 810.01.

Johnson.

811 G 3

**Legal Environment of Health Care**

W. 3 cl.

Prereq.: Permission of instructor.

Legal environment of health care, including hospital-patient-doctor relationships; labor law and collective bargaining; constitutional law and administrative regulations pertaining to prepayment and planning. Hughes.

### 812 G 3

#### Field Study in Health Services Management

Sp.

Prereq.: 6 cr. hrs. in Hosp. Admin. and permission of instructor.

Methods of management decision making, with externship in a local hospital or health agency for intensive study of a management problem. Johnson and Staff.

### 820 G 3

#### Hospital Financial Management

W. 3 cl.

Prereq.: Acc. 711 or equiv. and permission of instructor. Not open to students with credit for 827.

Specialized techniques and problems of financial management in the health service enterprise. Loebs.

### 821 G 3

#### Systems Analysis of Health Services

A. 3 cl.

Prereq.: 800 or permission of instructor.

Applications of systems techniques to health services; forecasting, quality measurement and control, methods improvement, and decision making under conditions of uncertainty.

### 831 G 3

#### Planning for Health Services

W. 3 cl.

Prereq.: Permission of instructor.

Not open to students with credit for 826.

Analysis of hospital planning environment; interrelationships of government, consumers, and providers; public policy issues and legal implications; development of hospital services plan. Caswell.

### 832 G 3

#### Planning for Health Facilities

Sp. 3 cl.

Prereq.: 831 or permission of instructor.

Review of trends in planning, design, construction, and financing of hospitals and other health facilities. Lash.

### 850 G 3

#### Seminar in Hospital Policy and Decision Making

W, Sp. 3 cl.

Prereq.: 18 cr. hrs. in Hosp. Admin. or permission of director.

Not open to students with credit for 840.

Repeatable to a maximum of 6 cr. hrs.

Policy process and methods of decision making; assignment and solution of managerial problems; case studies, with emphasis on strategy and implementation. Johnson.

## Humanities

### 280 U 5

#### City and Country in America, 1620-1830

A. 5 cl.

Prereq.: Permission of Dean.

Study of the interrelationships of European ideas and American environment and the development of city-country tensions in the colonial and early national periods.

### 281 U 5

#### City and Country in America, 1830-1920

W. 5 cl.

Prereq.: Permission of Dean.

Study of the transformation of American life associated with industrialization and urbanization and the resulting distinction of city and country life.

### 282 U 5

#### City and Country in America, 1920-1970

Sp. 5 cl.

Prereq.: Permission of Dean.

Study of the effects of national urbanization on life styles and values in contemporary American culture.

### 294 U 1-6

#### Group Studies

Prereq.: Permission of Dean.

Repeatable to a maximum of 18 cr. hrs.

Interdisciplinary course under the direct auspices of the College of Humanities involving materials of an interdepartmental or intercollegiate type.

### 694 U G 1-6

#### Group Studies

Prereq.: Permission of Dean.

Repeatable to a maximum of 18 cr. hrs.

Interdisciplinary course under the direct auspices of the College of Humanities involving materials of an interdepartmental or intercollegiate type.

## Industrial and Systems Engineering

Office: 210 Baker Systems Engineering Building, 1971 Neil Avenue

**Professors** Morris (Chairman), Bishop, Giffin, Lehoczkzy (Emeritus), Moore, Pepper, and Rockwell; **Associate Professors** Bond, Clark, Kibbey, Neuhardt, and Smith; **Assistant Professors** Miller, Swain, Wendell, and Wilhelm; **Instructor** Tait.

### 201 U 3

#### Foundry Practice<sup>1</sup>

A, Sp. 2 cl., 4 lab. hrs.

Prereq.: Ed. 2nd yr. standing or permission of chairman.

Not open to students in College of Engineering.

(Safety glasses must be worn in laboratory<sup>1</sup>.)

Lecture and laboratory coverage of casting technology; bench and machine molding, core making; pouring, cleaning, and surface finishing of castings.

## 202 U 5

### Machine Shop Practice<sup>1</sup>

A, Sp. 10 cl. and lab. hrs.

Prereq.: Engr. Gr. 100 or equiv., Ed. 2nd yr. standing or permission of chairman.

Not open to students in College of Engineering.

(Safety glasses must be worn in laboratory<sup>1</sup>.)

Laboratory practice on basic machine tools; course objective is to develop skills and knowledge that are essential for the industrial arts teacher at the secondary level.

## 294 U 1-5

### Group Studies

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Students are given an opportunity to pursue special studies not otherwise offered.

## 300 U 4

### Industrial and Systems Engineering I

A, Sp. 4 cl.

Prereq.: Statist. 425; prereq. or concur. Statist. 426.

The application of fundamental methods in industrial and systems engineering with emphasis on management systems and operations research.

## 301 U 4

### Manufacturing Engineering I<sup>1</sup>

A, W, Sp. 2 cl., 6 lab. hrs.

Prereq.: Engr. 3rd qtr., 2nd yr. standing and permission of chairman; Division of Design, permission of chairman.

(Safety glasses must be worn in laboratory<sup>1</sup>.)

Fundamentals and interrelationships of the principal manufacturing processes; laboratory work in the areas of foundry, machine tools, heat treating, and welding.

## 302 U 4

### Manufacturing Engineering II<sup>1</sup>

W, Sp. 3 cl., 4 lab. hrs.

Prereq.: 301 and permission of chairman.

(Safety glasses must be worn in laboratory<sup>1</sup>.)

Aspects of manufacturing engineering; emphasis on economics of process choice, production planning, estimating, inspection, and scheduling in metal fabrication and assembly.

## 303 U 4

### Industrial and Systems Engineering II

A, Sp. 4 cl.

Prereq.: Statist. 425; prereq. or concur. Statist. 426.

The application of fundamental methods in industrial and systems methods in industrial and systems engineering with emphasis on manufacturing and man-machine systems.

## 389 U 2

### Junior Inspection Trip

Sp. 1 wk. at end of W. Qtr.

Prereq.: Major standing in Indust. E.

A group visit to various industrial plants; students must register for the course and pay the laboratory fee at the beginning of the Spring Quarter.

## 406 U 4

### Industrial Quality Control

A, W. 4 cl.

Prereq.: 300 and Statist. 426.

The application of probability theory, statistics, and control theory to problems in product inspection and process control; economic evaluation of quality control techniques. Neuhardt.

## 485 U 4

### Practical Experience in an Industrial Organization

A. 10 wks. during Su. between 3rd and 4th yrs.

To be obtained in some engineering or industrial organization; the student shall present a satisfactory report upon the work done.

## 501 U G 4

### Man-Machine Systems I

A, W. cl., 1 2-hr. lab.

Prereq.: 406.

Analysis and measurement of man-machine systems.

## 502 U G 4

### Man-Machine Systems II

W, Sp. 3 cl., 1 2-hr. lab.

Prereq.: 501.

Principles of experimental evaluation and prediction of production systems.

## 503 U G 4

### Man-Machine Systems Design

A, Sp. 3 cl., 1 2-hr. lab.

Prereq.: 502.

Workplace, and control and display design; integrating models of man in man-machine systems through design problems.

## 504 U G 4

### Engineering Economic Analysis

W, Sp. 4 cl.

Prereq.: Acc. 212 and Statist. 426.

Economic analysis of engineering projects and methods of operation; introduction to the analysis of engineering decisions.

## 505 U G 4

### Production Engineering

A. 2 cl., 6 lab. hrs.

Prereq.: 302.

Fundamentals of production tooling and correlating with design and specifications of the product. Kibbey.

## 506 U 5

### Design of Production Systems

A, Sp. 3 cl., 2 2-hr. lab.

Prereq.: 501; concur. 502.

Integration of the methods and analytical techniques of industrial engineering into the design of a complete production system.

<sup>1</sup> Prescription lenses may be ordered through the Optometry Clinic, Optometry Building, or through any registered optometrist.

**507 U G 4****Production Programming**

W. 4 cl.

Prereq.: Math. 571.

Not open to students with credit for 602.

Mathematical formulation and solution of problems of scheduling, inventory control, logistics, etc.; course covers various linear models. Bishop.

**531 U 3****Tool Engineering**

A. 2 cl., 4 lab. hrs.

Prereq.: 301.

The design of tools, jigs, and fixtures; the basic elements of fixture design, such as form, locating points, clamping devices, and the use of standardized parts.

**532 U 3****Motion and Time Study**

W. 2 cl., 1 2-hr. lab.

Prereq.: Bus. Adm. 500 and 630, and Econ. 442.

Not open to students in College of Engineering.

The objectives, scope, and techniques of time study and methods analysis are considered from the standpoint of the factory and office supervisor.

**534 U G 4****Principles of Industrial Engineering**

A, W, Sp. 4 cl.

Prereq.: 3rd yr. standing in Engr.

Not open to majors in Indust. E.

A survey of the industrial engineering phase of manufacturing with emphasis on principles and problem solving methods.

**649 U G 5****Quantitative Design Methods in Systems Engineering I**

A, W. 5 cl.

Prereq.: 300.

Model formulation and solution methods for systems design problems based on concepts from linear algebra, vector spaces, and differential equations.

**650 U G 3****Quantitative Design Methods in Systems Engineering II**

W, Sp. 3 cl.

Prereq.: Statist. 426 or equiv.

Use of mathematical techniques; including finite calculus, Fourier analysis, and assorted transforms in the analysis of industrial engineering systems. Giffin.

**651 U G 4****Optimization for Industrial and Systems Engineers**

A, Sp. 4 cl.

Prereq.: 507.

Not open to students with credit for 750.06.

Techniques for formulation and solution of single-stage and sequential constrained optimization problems, including substitution, Lagrange multipliers, Kuhn-Tucker theory, quadratic forms, global extrema, and dynamic programming. Bishop.

**652 U G 3****Analysis of Inventory Systems**

A, Sp. 3 cl.

Prereq.: Statist. 426 or equiv.

Mathematical analysis applied to single stage inventory systems using both deterministic and probabilistic models. Giffin.

**653 U G 3****Engineering Data Analysis**

W. 3 cl.

Prereq.: 406.

Graphical and other special techniques for estimating parameters and testing goodness of fit of non-normal distributions to engineering data. Bond.

**654 U G 4****System Simulation with Discrete-State Models**

A. 3 cl., 2 lab. hrs.

Prereq.: Statist. 426, Engr. Gr. 200, or Compu. and Info. Sci. 240 or 241; or permission of instructor.

Analysis of system design problems via discrete-state computer simulation models; generation of random variables; design and programming of simulation models; simulation experimental procedures. Clark.

**655 U G 3****System Reliability and Availability**

Sp. 3 cl.

Prereq.: Statist. 426 or permission of instructor.

The prediction of system reliability and availability is studied; introduction of methods for analyzing system design concepts from the viewpoints of reliability and availability. Clark.

**693 U G 1-6****Individual Studies in Industrial Engineering**

Su, A, W, Sp.

Prereq.: 4th yr. standing and permission of instructor.

Repeatable to a maximum of 18 cr. hrs.

This course is intended to give the advanced student an opportunity to pursue special studies not offered in fixed curricula.

**694 U G 1-6****Group Studies in Industrial Engineering**

Su, A, W, Sp.

Prereq.: 4th yr. standing and permission of instructor.

Repeatable to a maximum of 12 cr. hrs.

Advanced topics in the various phases of industrial engineering.

**710 U G 3****Optimization in Operations Research**

A. 3 cl.

Prereq.: 750.06 or permission of instructor.

Creation and application of nonlinear programming models. Wendell.

**750 U G 3-18****Advanced Studies in Industrial Engineering**

A, W, Sp.

Prereq.: 4th yr. standing and permission of instructor.

Repeatable to a maximum of 24 cr. hrs.; subdivisions not repeatable.

The student must register for specific classes in areas as indicated below, and may register for more than one at a time.

- 750.01 Job Evaluation and Systems Performance Measurement
- 750.02 Organized Labor and Industrial Methodology
- 750.03 Industrial Applications for Statistics
- 750.04 Discrete-System Analysis and Control
- 750.05 Decision Theory
- 750.06 System Programming and Optimization
- 750.07 Contemporary Problems in Plant Layout and Design
- 750.08 Simulation of Complex Systems with Continuous-State Models
- 750.09 Forecasting and Estimating
- 750.10 Human Factors in System Design
- 750.11 Organization of Industrial Engineering Functions
- 750.12 Production Engineering
- 750.13 Environmental Stress Problems

### 796 U G 1-5

#### Interdepartmental Seminar on Urban Transportation

A, W, Sp.

(See under Interdepartmental Seminars)

### 811 G 3-12

#### Methods Engineering

Su, A, W, Sp.

Prereq.: 501 and 502.

Advanced work in one or more special phases of time study, motion study, job evaluation, wage analysis and payment systems, and speed and effort rating; the viewpoint of unions, and problems arising from labor-management relationships.

### 812 G 3

#### Advanced Systems Design

Su.

Prereq.: 650 and 652, or permission of instructor.

Advanced work in the analysis and design of production and logistic systems. Giffin.

### 813 G 3

#### Advanced Queuing Theory

A. 3 cl.

Prereq.: 650 and 843.

Mathematical analysis and design of waiting line systems emphasizing transient solutions, general arrival and service distributions, and priority queues and networks of queues. Giffin.

### 814 G 3

#### Stochastic Processes Used in Systems Engineering

A. 3 cl.

Prereq.: 650 or equiv. and Statist. 520.

Application of Markov processes in systems engineering, transient and steady-state solutions, transform methods, digital and analog computer methods. Clark.

### 815 G 3

#### Estimation of System Parameters from Time Series Data

W. 3 cl.

Prereq.: Statist. 521 or permission of instructor.

Estimation of parameter values for stochastic process models used in systems engineering, analysis of trends and spectral analysis of times series data, computer methods. Clark.

### 821 G 3-12

#### Problems in Production Engineering

Su, A, W, Sp.

Prereq.: 505.

Advanced work in one or more phases of production engineering involving problems in production design, equipment planning, tool design, and quantity and quality control. Kibbey.

### 828 G 3-12

#### Advanced Studies in Plant Design and Materials Handling

Su, A, W, Sp.

Prereq.: 506.

Advanced work in one or more special phases of plant design and materials handling.

### 830 G 3

#### Mathematical Programming: Linear

A. 3 cl.

Prereq.: 571 or equiv. or permission of instructor.

Convex and concave problems, global solutions, extreme point solutions, degeneracy, the Simplex methods, duality, complementary slackness, sensitivity analysis, parametric programming, and applications.

### 831 G 3

#### Mathematical Programming: Nonlinear

W. 3 cl.

Prereq.: 830, or Math. 571 and permission of instructor.

Convex sets, convex functions, saddle point optimality criteria, the Fritz John and Kuhn-Tucker conditions, sensitivity and parametric results, applications, and an introduction to algorithms.

### 832 G 3

#### Mathematical Programming: Advanced Nonlinear

Sp. 3 cl.

Prereq.: 831.

Wolfe/Falk duality, conjugate/geometric duality, applications of quality (e.g., geometric programming, quadratic programming, location problems, decomposition).

### 835 G 3

#### Product Development Experimentation I

A. 3 cl.

Prereq.: 842 and Statist. 641 or Statist. 645 or equiv.

Application of linear statistical models to industrial engineering experimentation with emphasis on resource constrained investigations. Neuhardt.

**836 G 3****Product Development Experimentation II**

Sp. 3 cl.

Prereq.: 835.

Continuation of 835; emphasis of heavily constrained experimentation in production engineering and quality control problems. Neuhardt.

**842 G 3****Operations Research I**

A, W. 3 cl.

Prereq.: Calculus, probability theory and statistical methods, and permission of instructor.

Introduction to the nature and problems of operations research and the study of actual case histories in the field.

**843 G 3****Operations Research II**

W, Sp. 3 cl.

Prereq.: 842.

The position of the model in operations research and the study of the important techniques and formal approaches to research problems.

**844 G 3****Operations Research III**

Sp. 3 cl.

Prereq.: 843.

Consideration of topics in operations research including research methodology in the various sciences, and the conduct of actual operations research investigations.

**845 G 3****Design of Decision Networks**

Sp. 3 cl.

Prereq.: 750.05.

Design of networks involving multiple, interacting decision makers including problems of complementarity, coordination, learning, and decentralization. Morris.

**851 G 3-12****Personnel Research in Engineering Industries**

Su, A, W, Sp.

Prereq.: 750.01 and 750.11.

Advanced work in one of the several phases of personnel management in engineering industries.

**861 G 3-12****Research in Decision Processes**

A, W, Sp.

Prereq.: 504 and 507.

Advanced work in decision theory and processes including criterion research, decision making under uncertainty and in conflict situations, and gaming techniques. Morris.

**862 G 3****Decision Theory**

W.

Prereq.: 750.05 or equiv.

Introduction to normative decision models and their applications. Morris.

**863 G 3****Dynamic Programming**

W.

Prereq.: 750.06 or equiv.

Theory, methodology, and application of dynamic programming. Bishop.

**864 G 3****Optimization of Dynamic Systems**

Sp. 3 cl.

Prereq.: 750.04 and 863 or equiv.

Study of theory and methodology for optimum control of dynamic systems (sequential decision systems); included are calculus of variations, Pontryagin Maximum Principle, and associated approaches. Bishop.

**866 G 3-12****Programming and Control Research**

Su, A, W, Sp.

Prereq.: 831 or 863.

Advanced work in the several phases of programming and control theory; consists primarily of application of mathematical methods to the formulation and solution of process programming and control problems. Bishop.

**871 G 3-12****Man-Machine Systems Research**

Su, A, W, Sp.

Prereq.: 750.10 and 750.13.

Advanced work in special research topics in man-machine systems. Rockwell and Smith.

**875 G 3****Human Factors Engineering in Vehicular Control**

Sp.

Prereq.: 750.10.

Characteristic and limitations of the human controller of air craft or surface vehicles, design and evaluation of control aids, and human adaptation to control dynamic changes. Rockwell.

**881 G 2****Seminar in Industrial Engineering**

A, W, Sp.

Repeatable to a maximum of 6 cr. hrs.

**899 G 1-5****Interdepartmental Seminar**

A, W, Sp.

(See under Interdepartmental Seminars.)

**999 G Arr.****Research in Industrial Engineering**

Su, A, W, Sp.

Research for thesis or dissertation purposes only.

**Industrial Technology**

(See Education: Industrial Technology)

## Interdepartmental Seminars

796 U G 1-5

### Interdepartmental Seminar in Urban Transportation

A, W, Sp.

Prereq.: Sr. standing or permission of instructor.

Repeatable to a maximum of 6 cr. hrs.

Lectures and discussions by faculty and guest speakers on topics related to urban transportation problems, issues, and new approaches to solutions. Term paper required. Given cooperatively by the Departments of Civil Engineering and Industrial and Systems Engineering. Clark, Godfrey, and Nemeth.

797 U G P 1-5

### Interdepartmental Seminars

Repeatable by permission.

Two or more departments may collaborate in presenting seminars in subjects of mutual interest; topics to be announced.

890 G 2

### Interdepartmental Seminar in Developmental Biology

A, W, Sp. 1 2-hr. cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 12 credit hours.

Students will present oral reports and lead discussion on research progress in specific areas of developmental biology; given cooperatively by the Departments of Botany, Biophysics, Genetics, Microbiology, and Zoology.

891 G 2

### Interdepartmental Seminar in Environmental Biology

Su, A, W, Sp. 1 2-hr. cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 24 cr. hrs.

Selected topics treating the environmental aspects of organisms, populations, and ecosystems as they may relate to time, space, and human activities; given cooperatively by the Departments of Botany, Entomology, Microbiology, and Zoology.

895 G 1-5

### Interdepartmental Seminar in Radio Astronomy

A, W, Sp.

Techniques of radio-astronomy; present state of knowledge of the universe as determined by radio-astronomy; given cooperatively by the Departments of Astronomy and Electrical Engineering.

896 G 1-3

### Interdepartmental Seminar in Polar and Alpine Studies

Sp. 1-3 hr. cl.

Permission of instructor.

Repeatable to a maximum of 9 cr. hrs.

A seminar on selected topics involving anthropology, biology, climatology, exploration, geology, glaciology, microbiology, and soils; given cooperatively by the Institute of Polar Studies, Biological Sciences, and the following departments: Agronomy, Anthropology, Civil Engineering, and Geography.

897 G 1

### Interdepartmental Seminar in Natural Resources

A, W, Sp.

Repeatable to a maximum of 9 cr. hrs.

A seminar in natural resources conservation; given cooperatively by the School of Natural Resources and the following departments: Agronomy, Agricultural Economics and Rural Sociology, Agricultural Engineering, Geography, Horticulture, and Plant Pathology.

898 G 1

### Interdepartmental Seminar in Nutrition and Food Technology

Sp.

A seminar in nutrition and in related fields of food technology; given cooperatively by the following departments: Animal Science, Dairy Science, Food Science and Nutrition, Horticulture, Physiological Chemistry, Plant Pathology, Poultry Science, and Preventive Medicine, and the School of Home Economics.

899 G 1-5

### Interdepartmental Seminars

Repeatable by permission.

Two or more departments may collaborate in presenting seminars on subjects of mutual interest; topics to be announced.

## International Studies

Office: 210 Welding Engineering Laboratories, 190 West 19th Avenue

Center for Undergraduate International Studies

Jan S. Adams (Director); Advisory Committee: A. E. Adams (Humanities), Burgess (Political Science), Chu (History), Hayon (Romance Languages), Kilpatrick (Social and Behavioral Sciences), McCoy (Political Science), Nemzer (Political Science), Smallwood (International Programs), and Twarog (Slavic Languages).

230 U 5

### Introduction to the Soviet Union

Su, A, W, Sp. 5 cl.

A survey of the land, people, history, politics, social institutions, literature, and arts of the Soviet Union, conducted by members of several departments. Adams.

231 U 5

### Introduction to Eastern Europe Since World War II

W. 5 cl.

Survey of the land, people, history, politics, social institutions, literature, and the arts of Eastern Europe since World War II. Rogel.

235 U 5

### Introduction to China and Japan

Sp. 5 cl.



Interdepartmental survey of contemporary Asian civilization; geographic and racial background, historical and cultural heritage, social organizations, economic and political problems, and international relations. Bartholomew.

**240 U 5**

**Introduction to Latin America**

Sp. 5 cl.

Interdepartmental survey of Latin American societies, anthropology, economics, history, literature, geography, and agriculture. McCoy.

**245 U 5**

**Introduction to the Modern Middle East**

A. 5 cl.

Interdepartmental survey of the land, people, history, politics, religions, philosophy, social institutions, economic development, and literature and the arts conducted by members of several departments. Findley.

**250 U 5**

**Introduction to Africa**

W. 5 cl.

Interdepartmental survey of the land, people, history, politics, social institutions, economic development, literature and the arts conducted by members of several departments. Arewa.

**294† U 3-5**

**Group Studies**

A, W, Sp.

Prereq.: Permission of instructor.

Groups of students are offered the opportunity to pursue the interdepartmental study of special topics.

**501 U G 5**

**Selected Problems in International Studies**

W. 2 cl.

Open only to Internat. S. majors or students with equiv. preparation.

Panel discussions, informal conferences, and a reading and research program arranged to meet the special needs of those enrolled. Stewart.

**594† U 3-5**

**Group Studies**

A, W, Sp.

Prereq.: Permission of instructor.

Designed to give groups of able students an opportunity to pursue special studies not otherwise offered.

**H783 U 3-5**

**Honors Course**

A, W, Sp.

Prereq.: Senior standing and 40 cr. hrs. in the social sciences including 15 cr. hrs. in courses acceptable for a major in Internat. S., with a grade of A in at least half of these major courses and an average of B in the remainder; permission of instructor under whose supervision the work is to be completed and the Arts and Sciences Honors Committee.

Repeatable to a maximum of 15 cr. hrs.

Informal conferences to allow full scope of the initiative of the student. A special topic is assigned to each student. The results are tested by conferences and special reports.

Failure to receive a mark of S in this course is a disqualification for special honors.

## Italian

Office: 248 Dieter Cunz Hall of Languages, 1841 Millikin Road

Professors Griffin (Chairman), Keller, and Mancini;  
Assistant Professors Alessia and Matteis.

**101 U 5**

**Elementary Italian**

Su, A, W, Sp. 5 cl.

Elements of Italian grammar with oral and written exercises; attention to ear training and oral practice; elementary reading based on Italian geography, history, and customs.

**102 U 5**

**Elementary Italian**

Su, A, W, Sp. 5 cl.

Prereq.: 101.

The elements of Italian grammar with abundant oral and written exercises; development of conversational skill; reading, vocabulary building, attention to Italian idioms; modern Italian prose.

**103 U 5**

**Intermediate Italian**

Su, A, W, Sp. 5 cl.

Prereq.: 102 or 110.

Review of Italian grammar; reading of short stories and plays; increased attention to development of oral and written proficiency.

**104 U 5**

**Intermediate Italian**

Prereq.: 103 or 112.

The following courses are not open to students with credit for 104, and only one of the decimal subdivisions may be taken for credit.

**104.01 Basic Course**

Su, A, W, Sp. 5 cl.

Required of Italian majors and recommended for students who intend to continue in Italian.

Not open to students with credit for 104 or any other 104 decimal subdivision.

Intensive practice in oral and written Italian; reading of Italian short stories; grammar and idiom review; course conducted in Italian.

**Students not planning to continue in Italian may substitute the following decimal subdivision for 104.01.**

**104.02 Civilization**

W. 5 cl.

Not open to students with credit for 104 or any other 104 decimal subdivision.

Aspects of Italian civilization; geography, history, social development, and the arts; readings and discussion in Italian.

**110 U 5, 10**

**Intensive Elementary Italian**

A, W, Sp. 10 cl.

Prereq.: Permission of dept.

Not open to students with credit for 102. Students with credit for 101 or equiv. may not register for more than 5 cr. hrs.

Elementary Italian for students wishing to acquire the basic skills in one quarter; intensive drill in form, syntax, vocabulary, and idiom; equivalent to 101 and 102.

### 112 U 5, 10, 15

#### Intensive Italian

Su. 15 cl. Enrollment limited to 20 students.

Prereq.: Permission of chairman.

Full time of student and full fees required.

Equiv. of 101, 102, and 103.

Students with credit for 101 or the equiv. may not register for more than 10 cr. hrs. Students with credit for 101 and 102 or the equiv. may not register for more than 5 cr. hrs. Students with credit for 103 or the equiv. may not register for credit.

Elementary and intermediate Italian; intensive drill in forms, syntax, vocabulary, and idiom; reading of short stories and plays in Italian.

### 193 U 1-15

#### Individual Studies

Su, A, W, Sp.

Prereq.: Permission of dept.

Repeatable to a maximum of 30 cr. hrs.

### 194 U 1-15

#### Group Studies

Su, A, W, Sp.

Prereq.: Permission of dept.

Repeatable to a maximum of 30 cr. hrs.

### 202 U 5

#### Italian Conversation and Composition

Sp. 5 cl.

Prereq.: 104 or permission of instructor.

### 271 U 3

#### Italian Literature in English Translation: 14th Century

A. 3 cl.

Prereq.: Engl. 100 or equiv.

Not open to majors in Ital.

Reading and interpretation of selections from Dante's Divine Comedy, Petrarch's Canzoniere, and Boccaccio's Decameron; discussion of their relation to the Middle Ages and the Renaissance.

### 272 U 3

#### Italian Literature in English Translation: 15th and 16th Centuries

W. 3 cl.

Prereq.: Engl. 100 or equiv.

Not open to majors in Ital.

Readings in such authors as Leonardo, Castiglione, Machiavelli, Ariosto, Tasso; discussion of their place in the Renaissance. Mancini.

### 273 U 3

#### Italian Literature in Translation: Modern

Sp. 3 cl.

Prereq.: Engl. 100 or equiv.

Not open to majors in Ital.

Intellectual and literary trends from the end of the 19th century to the present; works by Verga, Svevo, Pirandello, Silone, and Moravia. Matteis.

### 401 U 3

#### Review Grammar and Composition

W. 3 cl.

Prereq.: 104 or permission of instructor.

Review of Italian grammar; composition on assigned topics and practice in translation.

### 402 U 5

#### Intermediate Italian Conversation and Composition

Sp. 5 cl.

Prereq.: 104 or permission of instructor.

Vocabulary building, practice in speaking Italian, and composition dealing with various aspects of present-day Italian life.

### 404†\* U 5

#### Italian Pronunciation

A. 5 cl.

Prereq.: 104 or permission of instructor.

Standard Italian pronunciation; lectures and practice with corrective exercises; use of phonetic symbols.

### 421 U 5

#### Contemporary Italian Drama

W. 5 cl.

Prereq.: 104 or permission of instructor.

Reading and analysis of representative plays of such authors as Pirandello, Betti, and DeFilippo. Matteis.

### 422 U 5

#### Contemporary Italian Poetry

Sp. 5 cl.

Prereq.: 104 or permission of instructor.

Reading and analysis of poems representing the principle tendencies of contemporary Italian poetry with emphasis upon Montale, Ungaretti, and Quasimodo. Matteis.

### 423 U 5

#### Contemporary Italian Fiction

A. 5 cl.

Prereq.: 104 or permission of instructor.

Narrative prose in Italy since the end of the Second World War; selected readings from such authors as Moravia, Vittorini, Pavese, and Cassola. Matteis.

### 601 U G 5

#### Modern Italian Syntax

Sp. 5 cl.

Prereq.: 401 or permission of instructor.

Alessia.

### 603†\* U G 5

#### Advanced Italian Conversation and Composition

A. 5 cl.

Prereq.: 401 or 402, or permission of instructor.

Intensive practice in speaking and writing, based on contemporary usage.

### 604\* U G 3

#### Italian Phonetics

W. 2 cl., 1 hr. lab.

Prereq.: 404 or permission of instructor.

Training in auditory and oral aspects of Italian pronunciation; analysis of the phonetic structure of modern Italian.

**621†\* U G 5**

**Dante**

W. 5 cl.

Prereq.: 10 cr. hrs. at the 400 level or permission of instructor.

Introduction to the reading of the Divine Comedy; analysis of major episodes. Alessia.

**622\* U G 5**

**Petrarch and Boccaccio**

W. 5 cl.

Prereq.: 10 cr. hrs. at the 400 level or permission of instructor.

Historical and aesthetic analysis of Petrarch's poetry; Petrarchism as a European phenomenon; literary background of Boccaccio's prose and verse; reading from the Decameron. Alessia.

**623\* U G 5**

**Modern Italian Literature**

A. 5 cl.

Prereq.: 10 cr. hrs. at the 400 level or permission of instructor.

Italian literature from 1800 to 1920; Foscolo, Leopardi, Manzoni, Verga, Svevo, Carducci, and Pascoli. Matteis.

**624†\* U G 5**

**Contemporary Italian Literature**

A. 5 cl.

Prereq.: 10 cr. hrs. in Ital. literature at the 400 level or permission of instructor.

Intensive study of fiction, poetry, and drama from such authors as Moravia, Pavese, Montale, Quasimodo, Pirandello, and Betti. Matteis.

**625†\* U G 5**

**Italian Literature of the Renaissance**

Sp. 5 cl.

Prereq.: 10 cr. hrs. in Ital. literature at the 400 level or permission of instructor.

Readings in works of representative authors of the 15th and 16th centuries such as Leonardo, Michelangelo, Castiglione, Machiavelli, Ariosto, and Tasso. Mancini.

**626\* U G 5**

**Italian Literature of the 17th and 18th Centuries**

Sp. 5 cl.

Prereq.: 10 cr. hrs. in Ital. literature at the 400 level or permission of instructor.

Readings in selected works of Campanella, Marino, Galilei, Metastasio, Vico, Goldoni, Parini, and Alfieri. Mancini.

**693 U G 1-15**

**Individual Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 30 cr. hrs.

**694 U G 1-15**

**Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 30 cr. hrs.

**722 U G 3**

**Studies in Italian Literature: 14th Century**

Sp. 3 cl.

Prereq.: Grad. students, and by permission of instructor to seniors majoring in Ital. with credit for 621, 622, or equiv.

Intensive study of one author, major work, or topic such as historiography, jocular poetry, the Vita Nova; readings in relevant criticism and scholarship. Alessia.

**725\* U G 3**

**Studies in Italian Literature: 15th and 16th Centuries**

A. 3 cl.

Prereq.: Grad. students, and by permission of instructor to seniors majoring in Ital. with credit for 625 or equiv.

Intensive study of one author, major work, or topic such as epic poetry, the Courtier, Poliziano; readings in relevant criticism and scholarship. Mancini.

**726†\* U G 3**

**Studies in Italian Literature: 17th and 18th Centuries**

A. 3 cl.

Prereq.: Grad. students, and by permission of instructor to seniors majoring in Ital. with credit for 626 or equiv.

Intensive study of one author, major work, or topic such as baroque poetry, Tassoni, Alfieri's theatre; readings in relevant criticism and scholarship. Mancini.

**811 G 3**

**History of the Italian Language: Introduction**

Sp. 3 cl.

Prereq.: M.A. candidates in Ital., others by permission of instructor.

Basic concepts of historical linguistics; the major factors of change in the history of the Italian language from the Roman times to the present. Griffin.

**831\* G 2-5**

**Seminar in Italian Literature**

A.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

**832\* G 2-5**

**Seminar in Italian Literature**

W. 2 or 5 cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

**833†\* G 2-5**

**Seminar in Italian Literature**

Sp. 2 or 5 cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Mancini.

**885\* G 5**

**Introduction to Methods in the History and Criticism of Literature**

A. 4 or 5 cl.

Selected readings in basic literary history, criticism, and theory, with practice in the use of standard bibliographical aids to scholarship. Mancini.

**Medieval and Renaissance Culture**

(See Medieval and Renaissance Studies 888.)

**Medieval and Renaissance Literature**

(See Medieval and Renaissance Studies 889.)

**993 G 1-5****Individual Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

**994 G 1-15****Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 30 cr. hrs.

Investigation of minor problems in the various fields of Italian literature and language.

**999 G Arr.****Research in Italian Language or Literature**

Su, A, W, Sp.

Research for thesis or dissertation purposes only.

## Japanese

Office: 276 Dieter Cunz Hall of Languages, 1841 Millikin Road

Professor Li (Chairman); Associate Professors McElrath and Morita; Assistant Professor Quackenbush.

**101 U 5****Elementary Modern Japanese**

A. 5 cl.

Elements of standard colloquial Japanese grammar, with intensive oral and written exercises; introduction to the Japanese writing system (hiragana, katakana, and kanji). Ouackenbush and Staff.

**102 U 5****Elementary Modern Japanese**

W. 5 cl.

Prereq.: 101.

Continuation of 101. Quackenbush and Staff.

**103 U 5****Elementary Modern Japanese**

Sp. 5 cl.

Prereq.: 102 or 110

Continuation of 102. Quackenbush and Staff.

**104 U 5****Intermediate Modern Japanese**

A. 5 cl.

Prereq.: 103 or permission of instructor.

Elements of Japanese grammar; intensive practice in oral and written Japanese; reading of texts and Japanese short stories. McElrath and Staff.

**105 U 5****Intermediate Modern Japanese**

W. 5 cl.

Prereq.: 104 or permission of instructor.

Not open to students with credit for 405.

Continuation of 104. Quackenbush and Staff.

**106 U 5****Intermediate Modern Japanese**

Sp. 5 cl.

Prereq.: 105 or permission of instructor.

Not open to students with credit for 406.

Continuation of 105. Quackenbush and Staff.

**110† U 5 or 10****Intensive Japanese**

A. 10 cl.

Prereq.: Permission of dept.

Students with credit for 101 or the equiv. may not register for more than 5 cr. hrs. Not open to students with credit for 102.

An accelerated one-quarter course equivalent to 101 and 102.

**111† U 5 or 10****Intensive Japanese**

W. 10 cl.

Prereq.: 102, 110, or permission of instructor.

Students with credit for 103 or the equiv. may not register for more than 5 cr. hrs. Not open to students with credit for 104.

An accelerated one-quarter course equivalent to 103 and 104.

**112 U 5, 10, 15****Intensive Japanese**

Su.

Prereq.: Permission of dept.

Full time of student and full fees required.

Students with credit for 101 or the equiv. may not register for more than 10 cr. hrs. Students with credit for 101 and 102 or the equiv. may not register for more than 5 cr. hrs.

Not open to students with credit for 103 or 111. No audit.

An introductory course with emphasis on basic structure taught through oral-aural drill. hiragana, katakana, and a limited number of Japanese characters; equivalent to 101, 102, and 103.

**113† U 5 or 10****Intensive Japanese**

Sp. 10 cl.

Prereq.: 104, 111, or permission of instructor.

Students with credit for 105 or the equiv. may not register for more than 5 cr. hrs. Not open to students with credit for 106.

An accelerated one-quarter course equivalent to 105 and 106.

**114† U 3****Elementary Japanese Conversation and Composition**

Sp. 3 cl.

Prereq.: 102, 110, or permission of instructor.

Exercises in pronunciation, vocabulary and sentence patterns studied in 101 and 102, and the materials learned concurrently in 103; conducted predominantly in Japanese.

**214† U 3**

**Intermediate Japanese Conversation and Composition**

Sp. 3 cl.

Prereq.: 105 and 114, or permission of instructor.

Exercises in oral expression and composition; drill, discussion, and tape-listening using various materials at the second year level; conducted predominantly in Japanese.

**231 U 5**

**Elements of Japanese Culture**

Su, A. 5 cl.

Taught in English.

Not open to students with credit for 271.

A survey of literature, art, religion, philosophy, and social institutions of the Japanese people from the earliest to the most recent times. Wright.

**251 U 5**

**Classical Japanese Literature in Translation**

W. 5 cl.

A lecture and reading course in masterpieces of Japanese literature from the 8th to the 19th century. McElrath.

**252 U 5**

**Modern Japanese Literature in Translation**

Sp. 5 cl.

Japanese literature from early 19th century Western influences to present day; emphasis on the novel from Futabalei Shimel to Mishima Yukio; modern poetry and drama. Morita.

**501 U 3**

**Classical Japanese I**

A. 3 cl.

Prereq.: 106 or permission of instructor.

Not open to students with credit for 651.

A reading of classical literary works such as *Hojoki*, *Uji Shui Monogatari*, as well as waka poetry. McElrath and Staff.

**502 U 3**

**Classical Japanese II**

W. 3 cl.

Prereq.: 501 or permission of instructor.

Continuation of 501. McElrath.

**503 U 3**

**Classical Japanese III**

Sp. 3 cl.

Prereq.: 502 or permission of instructor.

Continuation of 502. McElrath.

**507 U G 5**

**Advanced Modern Japanese I**

A. 5 cl.

Prereq.: 106 or permission of instructor.

Not open to students with credit for 609.

Readings in modern Japanese aiming at acquisition of control of the 1850 characters in common use; translation, composition, character drill. Morita and Staff.

**508 U G 5**

**Advanced Modern Japanese II**

W. 5 cl.

Prereq.: 507 or permission of instructor.

Not open to students with credit for 610.

Continuation of 507. Morita and Staff.

**509 U G 5**

**Advanced Modern Japanese III**

Sp. 5 cl.

Prereq.: 508 or permission of instructor.

Not open to students with credit for 611.

Continuation of 508; supplementary readings in modern Japanese, including an introduction to basic Japanese dictionaries, encyclopedias, and other standard reference works. McElrath and Staff.

**514 U 3**

**Advanced Japanese Conversation and Composition**

W. 3 cl.

Prereq.: 214 and 508, or permission of instructor.

Lectures, discussion, reports; extensive use of taped materials including news broadcasts, drama, interviews, informal conversations; conducted entirely in Japanese.

**621 U G 3**

**Social Science Readings in Japanese I**

A. 3 cl.

Prereq.: 509 or permission of instructor.

Graded readings in Japanese social science subject matter, including materials from newspapers, periodicals, and learned journals; essentially a language course intended to improve fluency. McElrath and Staff.

**622 U G 3**

**Social Science Readings in Japanese II**

W. 3 cl.

Prereq.: 621 or permission of instructor.

Continuation of 621. Morita and Staff.

**623 U G 3**

**Social Science Readings in Japanese III**

Sp. 3 cl.

Prereq.: 622 or permission of instructor.

Continuation of 622. McElrath and Staff.

**661 U G 3**

**Readings in Modern Japanese Literature I**

A. 3 cl.

Prereq.: 509 or permission of instructor.

Selected readings in modern Japanese fiction, poetry, drama, literary history, and criticism; essentially a language course intended to improve fluency. Morita.

**662 U G 3****Readings in Modern Japanese Literature II**

W. 3 cl.

Prereq.: 661 or permission of instructor.

Continuation of 661. Morita.

**663 U G 3****Readings in Modern Japanese Literature III**

Sp. 3 cl.

Prereq.: 662 or permission of instructor.

Continuation of 662. Morita.

**680†\* U G 3****Introduction to Japanese Linguistics**

W. 3 cl.

Prereq.: 103 and Ling. 601, or permission of instructor.

An introduction to the phonology, syntax, and lexicon of the Japanese language. Quackenbush.

**681\* U G 3****History of the Japanese Language**

W. 3 cl.

Prereq.: 103 and Ling. 601, or permission of instructor.

A survey of the development of the Japanese language from early times to the present. Quackenbush.

**693 U G 1-5****Individual Studies**

Su, A, W, Sp.

Prereq.: 503 and 509, and permission of chairman.

Repeatable to a maximum of 15 cr. hrs.

Not a substitute for regular language courses.

Meets individual research needs of students in area studies and East Asian programs.

**694 U G 1-5****Group Studies**

Su, A, W, Sp.

Prereq.: 503 and 509, and permission of chairman.

Repeatable to a maximum of 15 cr. hrs.

Not a substitute for regular language courses.

Investigation of minor problems in Japanese language and literature.

**698\* U G 15****Study Tour of Japan**

Sp. 15 cl., 2 wks. at OSU; 8 wks. in Japan.

Prereq.: 25 cr. hrs. of Japan. or permission of instructor.

Advanced work in conversation and reading in order to prepare for the tour. In Japan only Japanese will be spoken; some formal instruction will be given daily by the tour leaders.

**782†\* U G 3****Japanese Phonology**

Sp. 3 cl.

Prereq.: 680, 681, or permission of instructor.

Not open to students with credit for 624.

An analysis of the phonological structure of present-day Japanese with a critical examination of traditional and contemporary works on Japanese phonology. Quackenbush.

**H783 U 3-5****Honors Course**

A, W, Sp.

Prereq.: 4th year standing; a record of A in at least half of the Japanese courses taken and an average of B in all courses; permission of instructor under whose supervision the work is to be completed and the Arts and Sciences Honors Committee.

Open only to candidates for B.A. in Japanese.

Repeatable to a maximum of 15 cr. hrs.

A program of reading arranged for each student, with individual conference, reports, and honor thesis.

**784\* U G 3****Japanese Syntax**

Sp. 3 cl.

Prereq.: 680, 681, or permission of instructor.

Not open to students with credit for 626.

A survey of the grammatical structures of present-day Japanese; presentation of syntactic rules within the model of transformational grammar. Akatsuka.

## Journalism

Office: 156 Rightmire Hall, 1060 Carmack Road

**Professors** Hall (Director), Maguire, Peterson, Pollard (Emeritus), Rarick, and Seifert; **Associate Professors** Clarke, Gaumer, Holsinger, MacDonald, Toran, and Underwood; **Assistant Professors** Bostwick (Emeritus), Brian, Collins, Drenten, Harless, Hudson, and Schaeffer; **Instructors** Jones, D. Tillinghast, and W. Tillinghast.

**101 U 3****Introduction to Mass Communication**

Su, A, W, Sp. 3 cl.

Prereq.: Engl. 100.

Introduction to the mass media in America, especially newspapers and broadcasting; analysis of forces and institutions affecting media behavior, and the resulting quality of performance.

**201 U 5****The Art of Communication**

A, W, Sp. 5 2-hr. lec./labs.

Prereq.: 101, typing ability required.

Reporting and writing news and features for the print and electronic media.

**202 U 3****News Writing**

Su, A, W, Sp. 1 cl., 2 2-hr. labs.

Prereq.: 201.

Continuation of 201 with emphasis on more complicated reporting and news writing.

**203 U 3****Photojournalism**

Su, A, W, Sp. 2 cl., 1 2-hr. lab.

Prereq.: 201.

Reporting the news with a camera; how to recognize, develop, and create picture stories; experience in coordinating words and news pictures; picture editing; layout.

**204 U 3**

**Editing**

Su, A, W, Sp. 2 cl., 2-hr. lab.

Prereq.: 201.

Editing of copy, headline writing, re-writing, and general copy desk work.

**211 U 4**

**The Graphics of Communication**

A, W, Sp. 2 cl., 2-hr. labs.

Prereq.: 201 or permission of instructor.

An introduction to the functions of visual and graphic communication in news in the print and electronic media, involving creative typography, photography, and perception.

**411 U 3**

**Reporting for Radio and Television**

Su, A, Sp. 2 cl., 1 2-hr. lab.

Prereq.: 202, 203, and 211.

A study of ethical, aesthetic, and technical problems in broadcast news reporting; use of audio-visual materials, instruments, and techniques.

**421 U 2**

**Journalism Laboratory—News Editorial**

Su, A, W, Sp.

No more than a total of 4 cr. hrs. may be earned in any combination of decimal subdivisions of 421 and 422.

Reporting, editing and photojournalism, primarily for The Lantern.

**421.01 Reporting**

Prereq.: 202, 204, and 211.

**421.02 Editing**

Prereq.: 202, 204, and 211.

**421.03 Photojournalism**

Prereq.: 202, 203, 204, 211, and permission of instructor.

**422 U 2**

**Journalism Laboratory—Broadcasting**

A, W, Sp.

Prereq.: 411 or permission of instructor.

No more than a total of 4 cr. hrs. may be earned in any combination of decimal subdivisions of 421 and 422.

Reporting and editing news primarily for broadcast news programs produced by the School of Journalism.

**422.01 Radio**

**422.02 Television**

**555**

**Factual Writing**

Su, A, W, Sp.

Prereq.: Engl. 100 or equiv.

Not open to students majoring in Jour.

Gathering and writing factual material; research interviewing, critical analysis, and rewriting are stressed.

**555.01 Agriculture**

**U G 3**

**555.02 Home Economics**

**U G 5**

**555.03 Nursing**

**U G 5**

**555.04 Dental-Medical**

**U G 5**

**555.05 General**

**U G 5**

**571 G 5**

**Basic Journalism for Beginning Graduate Students**

Su, A. 3 cl., 2 2-hr. labs.

Prereq.: Grad. standing and permission of instructor.

Credit does not apply to the minimum hours required for graduate study in Journalism.

Introduction to the literature of journalism, reporting and news writing, editing of copy for mass media, elements of photojournalism and basic typography and production processes.

**602 U G 3**

**Magazine Writing**

A, W, Sp. 3 cl.

Prereq.: 202 or permission of instructor.

Non-fiction writing for publication in general, professional, trade, or Sunday magazines with emphasis on the full-length magazine article.

**605 U G 4**

**The Development of the Mass Media in America**

A, W, Sp. 4 cl.

Prereq.: Junior, senior, or grad. standing.

Major currents and trends basic in the shaping of the mass media; famous personalities, foundations, and evolution of a free, responsible press.

**607 U G 4**

**Law of the Press, Radio, and Television**

A, W, Sp. 4 cl.

Prereq.: Junior, senior, or grad. standing.

History, principles, and provisions of the law of libel, slander, copyright, and other statutes affecting newspapers, other publications, and broadcasting.

**612 U G 3**

**Special Radio and Television News Programs**

W. 2 2-hr. lec. labs.

Prereq.: 422.01 and 422.02.

Planning and production of special news programs; such as the sportscast, the interview, special events, and documentaries.

**The Supervision of Journalism in Secondary Schools**

(See Ed Hums 614)

**623 U G 3**

**The Writing of Reviews and Criticisms**

Su, A, W, Sp.

Prereq.: Junior, senior, or grad. standing or permission of instructor.

Study of the work of the dramatic and literary critic, especially on newspapers and magazines; practice in writing reviews and criticisms.

**624 U G 3**

**The Editorial Page**

A, Sp. 3 1-hr. cl.

Prereq.: Jour. 4th yr. standing or permission of instructor.

Study of the purpose, form, style, and spirit of the editorial; consideration of current events, practice in news interpretation, and other editorial writing.

**625 U G 3****Investigative Reporting**

W, Sp. 1 3-hr. cl., conf. arr.

Prereq.: Jour. 4th yr. standing or permission of instructor.

Intensive reporting and writing.

**626 U G 5****Newspaper Management, Circulation, and Advertising**

Sp. 4 cl., 3-hr. lab.

Prereq.: Jour. 4th yr. standing or permission of instructor.

Consideration of the tasks and problems of newspaper management with emphasis on circulation policies and methods and those affecting advertising.

**627 U G 3****Advanced Editing**

A, W, Sp. 1 lec. 2 2-hr. labs.

Prereq.: Jour. 3rd yr. standing or permission of instructor.

Repeatable to a maximum of 12 cr. hrs.

Advanced theory and practice in news selection, preparation and display for newspaper, magazine, broadcast and photo-journalism media; emphasis on the responsibility of the journalist.

**627.01 News-Editorial**

**627.02 Radio-Television**

**627.03 Photojournalism**

**627.04 Magazine**

**631 U G 3****Public Relations Principles**

A, W, Sp. 3 cl.

Prereq.: Junior, senior, or grad. standing.

Origin and development of public relations, including ethical standards and functional role in modern society; basic principles of public relations theory, philosophy, and operation.

**632 U G 3****Case Studies in Public Relations**

W. 3 cl.

Prereq.: Junior, senior, or grad. standing.

Specific case studies designed for internal and external audiences; organization, administration of programs and departments; analysis of techniques, channels, media, and applicable research methods.

**633 U G 3****Public Relations Practice**

A, Sp. 2 2-hr. cl.

Prereq.: 631 or 632.

Open only to declared Jour. seniors or grad. students.

Application of principles to specific public relations problems.

**641 U G 3****Reporting Public Affairs**

Su, A, W, Sp. 2 cl., 1 2-hr. lab.

Prereq.: 421.01 and junior, senior, or grad. standing in Jour.

Instruction and practice in reporting the news of government, the courts, politics, education, finance, intergovernmental relations, political public opinion, and urban affairs.

**642 U G 4****The Mass Media, Society, and Basic Issues**

A, W, Sp. 1 cl., 1 2-hr. seminar.

Prereq.: Senior or grad. standing, or permission of instructor.

Analysis of the basic issues affecting news performance, especially ethics, news management, government control, gatekeeping, monopoly, etc.; assessment of the effects of the resulting performance.

**643 U G 4****The World Press**

A, W, Sp. 3 cl., conf. arr.

Prereq.: Junior, senior or grad. standing, or permission of instructor.

An analysis of newspapers, news agencies, and broadcast news outlets and their roles in the political, economic and cultural development of their nation states.

**651 U G 4****Mass Media Research and Theory**

Su, A, W. 4 cl.

Prereq.: Junior, senior or grad. standing, or permission of instructor.

Theories of mass communication, including models based on information theory, learning theory, attitude theory, and sociocultural theory; field studies, experiments, and content analysis.

**693 U G 1-5****Individual Studies**

Su, A, W, Sp.

Prereq.: Jour. 4th yr. or grad. standing and permission of instructor.

No more than 5 cr. hrs. for undergrad. and 6 cr. hrs. for grad. students may be earned in any combination of decimal subdivisions.

Students make extensive and significant studies in the field of journalism.

**693.01 News-Editorial**

**693.02 Radio and Television**

**693.03 Photojournalism**

**693.04 Magazines**

**693.05 Public Relations**

**694 U G 1-15****Group Studies**

A, W, Sp.

Repeatable to a maximum of 25 cr. hrs.

Regular class meetings and group discussions of specified problems.

a. Mass Media and Black America.

b. International Journalism Tour.

c. Critical Writing—Theatre, Cinema.

d. Intensified Study of Journalism.

e. Reporting Public Affairs at the Federal Level. (Enrollment limited to graduate students in the Kiplinger program.)

f. Reporting Public Affairs at the State and Local Levels. (Enrollment limited to graduate students in the Kiplinger program.)

g. Field Practice in Public Affairs Reporting. (Enrollment limited to graduate students in the Kiplinger program.)



**H783 U 3-5****Honors Course**

Su, A, W, Sp.

Prereq.: Sr. standing, a grade of A in half of the major courses and a B in the remainder; permission of instructor under whose supervision the work is to be completed and the Arts and Sciences Honors Committee.

Repeatable to a maximum of 15 cr. hrs.

A program for students who are candidates for a degree with distinction in journalism.

**801 G 4****Seminar in Journalism**

Su, A, W, Sp.

Repeatable to a maximum of 12 cr. hrs.

Integrated reading and research in the fields of journalism.

- Field Studies in Mass Communication.
- Experimental Studies in Mass Communication.
- Content Analysis in Mass Communication.
- Theories of Mass Communication.

**802 G 4****Seminar in Journalism**

Su, A, W, Sp.

Repeatable to a maximum of 12 cr. hrs.

Integrated reading and research in the fields of journalism.

- People, Society, and Mass Media.
- History of Mass Media.
- Legal Problems in Communication.
- Literature and Journalism.

**803 G 4****Seminar in Journalism**

Su, A, W, Sp.

Repeatable to a maximum of 12 cr. hrs.

Integrated reading and research in the fields of journalism.

- Problems in News-Editorial Journalism.
- Problems in Radio-Television Journalism.
- Problems in Photojournalism.
- Problems in Magazine Journalism.
- Problems in Public Relations.

**811 G 5****The Foreign Press**

A. 2 2½-hr. seminars.

Prereq.: Grad. standing and permission of Director of the School of Journalism and fluency in at least one foreign language spoken in student's area of specialization.

A comparative study of news systems in the foreign mass media in major world areas, showing them as products of specific political, economic and social philosophies.

**812 G 5****International Communications**

W. 2 2½-hr. seminars.

Prereq.: Grad. standing and permission of Director of the School of Journalism and fluency in at least one foreign language spoken in student's area of specialization.

Practices of journalism throughout the world and their role in hindering or advancing the international dissemination of news; manipulative communication between nations.

**813 G 5****Foreign Correspondence**

Sp. 2 2½-hr. seminars.

Research for thesis purposes only.

Prereq.: Grad. standing and permission of Director of the School of Journalism and fluency in at least one foreign language spoken in student's area of specialization.

Analysis of international developments as reported in world press media as to their origins, issues, and likely evolution.

**899 G 1-5****Interdepartmental Seminar**

Su, A, W, Sp.

(See under Interdepartmental Seminars.)

**911 G 5****Foreign Internship**

Su, A, W, Sp.

Prereq.: 811, 812, 813, and permission of Director of the School of Journalism.

Repeatable to a maximum of 20 cr. hrs.

Students will spend from two to four quarters abroad, associated with newspapers, news agencies, broadcast outlets, news magazines, or universities.

**999 G Arr.****Research in Journalism**

Su, A, W, Sp.

## Landscape Architecture

(School of Architecture)

Office: 189C Brown Hall, 190 West 17th Avenue

**Professor Tobey; Associate Professor Carpenter;**  
**Assistant Professor Kobayashi.**

**200 U 5****Design of Gardens and Small Properties**

A, W. 2 cl., 9 lab. hrs.

Landscape design for nonprofessional students, emphasizing design process, graphic presentation, and use of plant materials as design elements in solving microscale problems.

**201 U 3****History of Landscape Architecture**

A. 3 cl.

A critical and historical analysis of the organization of outdoor space from earliest times to the Italian Renaissance; emphasis on physical forms resulting from social, cultural, and technological forces.

**202 U 3****History of Landscape Architecture**

W. 3 cl.

A critical and historical analysis of the organization of outdoor space from the French Renaissance to 1900 A.D.; emphasis on physical forms resulting from social, cultural, and technological forces.

**203 U 3****History of Landscape Architecture**

Sp. 3 cl.

A critical and comparative analysis of the organization of outdoor space since 1900 A.D.; emphasis on physical forms resulting from social, cultural, and technological forces.

**241 U 5****Landscape Architectural Design**

A. 1 cl., 14 lab. hrs.

Prereq.: Open only to students enrolled in School of Architecture.

Not open to students with credit for Arch. 111 or Arch 241.

Study of existing outdoor spaces via graphics and models; design principles, elements and spatial organization.

**242 U 5****Landscape Architectural Design**

W. 1 cl., 14 lab. hrs.

Prereq.: 241 and Arch. 221.

Not open to students with credit for Arch. 112 or Arch. 242.

Development of landscape design skills in abstract and real forms; color and complex spatial organization.

**243 U 5****Landscape Architectural Design**

Sp. 1 cl., 14 lab. hrs.

Prereq.: 242.

Not open to students with credit for Arch. 113 or Arch. 243.

Landscape design and programming processes; integration of these processes with previously developed skills.

**300 U 3****Outlines of Landscape Architecture**

A, W, Sp. 3 cl.

Not open to candidates for the Bachelor of Land. Arch. degree.

Landscape architecture and environment; relations with other disciplines. Carpenter.

**321 U 4****Landscape Construction: Site Systems**

A. 2 cl., 4 lab. hrs.

Prereq.: Math. 150 and Arch. 221.

Not open to students with credit for 221.

Study of land development techniques essential to the horizontal development of site development schemes.

**322 U 4****Landscape Construction: Site Systems**

W. 2 cl., 4 lab. hrs.

Prereq.: 321.

Not open to students with credit for 222.

Study of land development techniques essential to the vertical development of site development schemes; emphasis on drainage, grading, and soils.

**323 U 4****Landscape Construction: Site Systems**

Sp. 2 cl., 4 lab. hrs.

Prereq.: 322.

Not open to students with credit for 223.

Integration of site systems; application of site technology to preparation of fully developed site layout and grading construction drawings.

**341 U 5****Landscape Architectural Design**

A. 1 cl., 14 lab. hrs.

Not open to students with credit for 211.

The landscape design process applied to site analysis, circulation, spatial structure, and design detailing.

**342 U 5****Landscape Architectural Design**

W. 1 cl., 14 lab. hrs.

Prereq.: 341.

Not open to students with credit for 212.

The landscape design process with emphasis on plant materials as major site design material.

**343 U 5****Landscape Architectural Design**

Sp. 1 cl., 14 lab. hrs.

Prereq.: 342.

Not open to students with credit for 213.

Social science inputs in landscape design at site planning scale; use of plant materials in spatial form development.

**421 U 4****Landscape Construction: Materials I**

W. 2 cl., 4 lab. hrs.

Prereq.: 323.

Not open to students with credit for 521.

Properties and production of man-made landscape building materials; material performance in exterior application; construction detailing with emphasis on wood and masonry assemblies.

**422 U 4****Landscape Construction: Materials II**

Sp. 2 cl., 4 lab. hrs.

Prereq.: 421.

Not open to students with credit for 522.

Application of man-made landscape building materials to construction problems; emphasis on metals, ceramics, concrete, asphalt, and plastic materials.

**441 U 5****Landscape Architectural Design**

A. 1 cl., 14 lab. hrs.

Prereq.: 343.

Not open to students with credit for 511.

Application of landscape design technology; case studies at project scale.

**442 U 5****Landscape Architectural Design**

W. 1 cl., 14 lab. hrs.

Prereq.: 441.

Not open to students with credit for 512.

Macroscale site planning; environmental criteria as bases for design decision making.

**443 U 5**  
**Landscape Architectural Design**

Sp. 1 cl., 14 lab. hrs.

Prereq.: 442.

Not open to students with credit for 513.

Macroscale environmental planning; emphasis on multidisciplinary approaches to landscape design.

**451 U 4**  
**Landscape Architecture Seminar**

A. 4 cl.

Prereq.: 323.

Not open to students with credit for 401 or 501. Research, discussion, and exercises pertinent to landscape architecture and related fields.

**693 U G 2-5**  
**Individual Studies in Landscape Architecture**

A, W, Sp.

Prereq.: 4th yr. standing or permission of division.

Repeatable to a maximum of 20 cr. hrs.

For students in the Graduate School and those who wish to pursue special studies in landscape architecture.

**694 U G 2-5**  
**Group Studies in Landscape Architecture**

Su, A, W, Sp.

Prereq.: Permission of the division.

Repeatable to a maximum of 15 cr. hrs.

For students majoring in Landscape Architecture desiring to pursue special studies not offered in the fixed curriculum.

## Latin

Office: 217 Derby Hall, 154 North Oval Drive

**Professors** Morford (Chairman), Abbott, Babcock, Forbes (Emeritus), Gordon, and Lenardon; **Associate Professors** Davis Hahm, and Schlam; **Assistant Professors** Kratz, Shumaker, Snyder, Sweet, and Tracy.

Also see Classics.

Students with two years of high school Latin should enroll in Latin 103; with three years of high school Latin, including Cicero, in Latin 104; with three years of high school Latin, including Vergil, in 103 and 201. Latin majors should consult the departmental statement in the College of Humanities section of the Colleges of the Arts and Sciences catalog. Placement tests are required for all matriculating (including transfer) students who continue the study of Latin in the University in courses 100, 101 102, 103, 104, 200, 201, and 202. A placement test will be given on the first day of the quarter. For details see the departmental secretary in 217 Derby Hall.

**100 U 5**  
**Latin Review**

A. 5 cl.

Prereq.: Placement test.

For those students whose elementary Latin will begin with a review and continue as a preparation for Latin 103.

**101 U 5**  
**Elementary Latin**  
 A, W. 5 cl.

**102 U 5**  
**Elementary Latin**  
 W, Sp. 5 cl.  
 Prereq.: 101.

**103 U 5**  
**Intermediate Latin**

A, W, Sp. 5 cl.

Prereq.: 2 yrs. of secondary school Latin, or 102, or 050. Intermediate readings with emphasis on prose authors on the 1st century B.C.

**104 U 5**  
**Intermediate Latin**

Su, A, W, Sp. 5 cl.

Prereq.: 3 yrs. of secondary school Latin, or 103, or 112. Intermediate readings with emphasis on the poetry of the Augustan Age.

**112 U 5, 10, 15**  
**Intensive Introduction to Latin**

A. 10 cl. and 10 or more hrs. of supervised study.

Full time of student and full fees required. Equiv. of 101, 102, and 103. Students with credit for 101 or the equiv. may not register for more than 10 cr. hrs. Students with credit for 101 and 102 or the equiv. may not register for more than 5 cr. hrs. Students with credit for 103 or the equiv. may not register for credit.

**200†\* U 5**  
**Latin Lyric**

W. 5 cl.

Prereq.: 104 or equiv. in secondary school Latin.

Selections from the lyric poetry of Catullus and Horace. Babcock.

**201†\* U 5**  
**Republican Prose**

A. 5 cl.

Prereq.: 104 or equiv. in secondary school Latin.

Selections from the works of one or more of the following authors: Cicero, Caesar, Sallust, Nepos.

**202†\* U 5**  
**Latin Comedy**

Sp. 5 cl.

Prereq.: 104 or equiv. in secondary school Latin.

Selected plays of Plautus and Terence.

**203\* U 5**  
**Prose of the Empire**

Sp. 5 cl.

Prereq.: 104 or equiv. in secondary school Latin.

Selections from the works of one or more of the following authors: Livy, Pliny, Seneca, Suetonius. Abbott.

**204\* U 5****Satire**

W. 5 cl.

Prereq.: 104 or equiv. in secondary school Latin.

Selections from the satires of Horace and Juvenal. Babcock.

**205\* U 5****Augustan Poetry**

A. 5 cl.

Prereq.: 104 or equiv. in secondary school Latin.

Selections from the works of one or more of the following authors: Ovid, Propertius, Tibullus, Vergil. Davis.

**303† U 3****Grammatical Review**

A. 3 cl.

Prereq.: 2 courses at 200 level.

**312† U 3****Intermediate Latin Prose Composition**

W. 3 cl.

Prereq.: 4 courses more advanced than 104, one of which must be 303; and at least 2 courses from 304-305-306.

**501†\* U G 5****Elementary Latin for Graduate Students**

A. 5 cl.

Prereq.: Grad. standing or permission of instructor.

Credit does not apply to minimum hours required for the master's or doctoral degree. No audit.

Basic Latin grammar and syntax for mature students proceeding to work in non-classical fields using Latin sources. Snyder.

**502†\* U G 5****Intermediate Latin for Graduate Students**

W. 5 cl.

Prereq.: Grad. standing or permission of instructor: Grade of C or above in 501 or equiv. preparation by a placement test.

Credit does not apply to the minimum hours required for the master's or doctoral degrees. No audit.

Repeatable to a maximum of 10 cr. hrs.

Continuation of 501 with reading of longer and more difficult texts as preparation for 625. Snyder.

**612† U G 3****Advanced Latin Prose Composition**

A.

Prereq.: 312 or equiv.

**615†\* U G 3****Readings in Cicero**

A. 3 cl.

Prereq.: 4 courses more advanced than 104.

**616\* U G 3****Readings in Vergil**

Sp. 3 cl.

Prereq.: 4 courses more advanced than 104.

Sweet.

**617\* U G 3****Readings in Caesar**

A. 3 cl.

Prereq.: 4 courses more advanced than 104.

Abbott.

**618†\* U G 3****Readings in Lucretius**

A. 3 cl.

Prereq.: 4 courses more advanced than 104.

Not open to students with credit for 339.

**619†\* U G 3****Readings in Ovid**

W. 3 cl.

Prereq.: 4 courses more advanced than 104.

Not open to students with credit for 344.

**620\* U G 3****Readings in Livy**

W. 3 cl.

Prereq.: 4 courses more advanced than 104.

Not open to students with credit for 300.

Morford.

**625 U G 3****Introduction to Medieval Latin**

Sp. 3 cl.

Prereq.: For departmental majors, four courses more advanced than 104; for others, 2 yrs. of secondary school Latin, or Latin 112, and a reading knowledge of a modern Romance language or Ger.

Extensive reading in texts illustrating the history of Latin language and literature from the fourth through the thirteenth century. Schlam.

**693 U G 1-6****Individual Studies in Latin**

Su, A, W, Sp.

Prereq.: 4 courses more advanced than 104.

Repeatable to a maximum of 15 cr. hrs.

Passages for reading and topics for investigation will be selected to meet the needs of individual students.

**694 U G 1-6****Group Studies**

Su, A.

Prereq.: 4 courses more advanced than 104 or permission of chairman.

Repeatable to a maximum of 20 cr. hrs.

**699† U 3****Senior Seminar**

Sp. 2 1½-hr. cl.

Prereq.: Sr. standing or permission of chairman.

Open only to seniors majoring in Latin or to those who have special permission to enroll.

Seminar for senior majors with particular emphasis on one author or genre.

GENERAL PREREQUISITES FOR COURSES  
NUMBERED 800 AND ABOVE

Prerequisites for admission to courses numbered 800 and above are graduate standing and permission of the chairman.

800†\* G 3

**Proseminar**

A.

Required of all grad. students.

Students may not receive credit for both Latin 800 and Greek 800.

An introduction to the materials and methods of research; the history of classical scholarship; individual assignments in bibliographical problems. Abbott.

802† G 4

**Plautus and Terence**

A.

Abbott.

803† G 4

**Horace**

W.

Babcock.

804 G 4

**Tacitus**

A.

Babcock.

805† G 4

**Seneca**

Sp.

Abbott.

806† G 4

**Livy**

W.

807† G 4

**Petronius and Apuleius**

Sp.

Schlam.

808 G 4

**Lucretius**

Sp.

Snyder.

809 G 4

**Lyric and Elegiac Poetry**

W.

Davis.

810† G 4

**Sallust**

A.

Morford.

811† G 4

**Juvenal**

W.

Morford.

812† G 4

**Vergilian Studies**

Sp.

820 G 3

**Introduction to Historical Latin Grammar**

A.

Abbott.

827 G 3

**Vulgar Latin**

W.

Prereq.: Grad. standing in Latin, or French 812, or equiv. linguistic basis.

Abbott.

850† G 4

**History of Roman Literature**

A.

Lectures and assigned reading in literary histories on the development of Roman literature; required and suggested passages for translation in each author studied; weekly reports.

851† G 4

**History of Roman Literature**

W.

Continuation of 850.

852† G 4

**History of Roman Literature**

Sp.

Continuation of 851.

855†\* G 3

**Latin Epigraphy**

Sp.

Babcock.

856†\* G 3

**Topography of Rome**

Sp.

The topography and archaeology of Ancient Rome as background to Roman history and literature.

Morford.

860 G 3

**Palaeography**

W.

Schlam.

861† G 3

**Textual Criticism**

W.

Prereq.: 860.

Abbott.

870† G 3

**Seminar in Latin Literature**

A. 1 2-hr. cl.

Prereq.: Permission of instructor.

Open only to secondary school teachers.

Repeatable to a maximum of 30 cr. hrs.

Readings and discussions around a chosen subject designed to enrich the classroom work of secondary school teachers.

**Medieval and Renaissance Culture**

(See Medieval and Renaissance Studies 888.)

**Medieval and Renaissance Literature**

(See Medieval and Renaissance Studies 889.)

993 G 1-4

**Individual Studies**

Su, A, W, Sp.

Repeatable to a maximum of 20 cr. hrs.

Assigned reading and individual research.

994† G 1-6

**Group Studies**

Su, A.

Repeatable to a maximum of 20 cr. hrs.

995† G 5

**Seminar I**

A.

Repeatable to a maximum of 20 cr. hrs.

Credit in this course will be granted only with the completion of 996.

The seminar will normally consist of a two-term sequence (A-W or W-Sp); an intensive study of an author or genre, e.g., Horace, Lucan, Cicero, or satire. Topic for 1973-1974: Apuleius, Schlam.

996† G 5

**Seminar II**

W.

Prereq.: 995.

Repeatable to a maximum of 20 cr. hrs.

Continuation of 995.

999 G Arr.

**Research**

Su, A, W, Sp.

Research for thesis or dissertation purposes only.

**Law**

Office: 112 Law Building, 1659 North High Street

**Professors** Kirby (Dean), Bernstein, Caldwell, Callahan, Clovis, Day, Fink, Herman, Kindred, Kozyris, Laughlin, R. Lynn, Miller, Murphy, Nordstrom, Rose, Rosenn, Rutledge, Schwarz, Shipman, Simmons, Slagle, Slain, and Wills; **Associate Professors** Geltner and Jacob; **Assistant Professors** Champlin, Lawson, Quigley, and Spitz; **Adjunct Professors** Alton, Bowen, Cavendish, Elam, Glander, Holschuh, Knepper, Ladd, A. Lynn, Mayer, Moots, and Platt.

502 P 1-0

**Appellate Practice I**

A, W, Sp. 3-qr. sequence; 1 cr. hr. assigned A, and 0 cr. hr. assigned W, and Sp.

S or U grade given on completion of 3-qr. program.

Procedural and substantive aspects of appellate practice; the student prepares a brief and presents an oral argument on the basis of assigned research materials. Herman and Moot Court Governing Board.

503 P 3

**Contracts**

A, W, Sp. 3 cl.; 3-qr. sequence; credit given on completion of 9 cr. hrs.

Remedies for breach; offer and acceptance; consideration; third party beneficiaries; assignment of rights and delegation of duties; conditions; impossibility and frustration; statute of frauds. Clovis and Nordstrom.

504 P 2-4

**Torts**

A. 2 cl., W, Sp. 3 cl. or A, W. or W, Sp. 4 cl., 3 or 2-qr. sequence; credit given on completion of 8 cr. hrs.

Trespass to person; negligence; misrepresentation; nuisance, strict liability; liability insurance; alternatives to the fault system; and federal and state regulation of traffic safety. Geltner and Miller.

505 P 3

**Property I**

A, W. 3 cl.; 2-qr. sequence; credit given on completion of 6 cr. hrs.

Incidents of ownership as applied to both real and personal property; possessory interests; concurrent interests; marital interests; future interests; contractual modification of these interests. Callahan, R. Lynn, and Simmons.

506 P 3

**Property II**

Sp. 3 cl.

Acquisition and transfer of ownership; adverse possession; conveyances (deeds, mortgages, and leases); intestacy; wills; the recording systems; title registration. Callahan and R. Lynn.

507 P 3

**Civil Procedure**

A, W, Sp. 3 cl., 3 qtr. sequence; credit given on completion of 9 cr. hrs.

Civil procedure in state and federal courts; development of equity; abolition of common law forms of action; merger of law and equity; jurisdiction; venue. Fink, Slagle, and Wills.

**510 P 3****Constitutional Law**

W, Sp. 3 cl., 2-qr. sequence; credit given on completion of 6 cr. hrs.

Functional study of the major substantive, methodological, and federalistic limitations upon governmental power obtaining under practice of judicial review. Laughlin, Rosenn, and Schwarz.

**511 P 2****Legal Research**

A.

Use of law books, both English and American; problems in the use of reports, statutes, selected annotated cases, texts, encyclopedias, digests, dictionaries, periodicals, and citation books.

**512 P 3****Introduction to Federal Income Taxation**

A. 3 cl.

Basic topics in federal income taxation under Internal Revenue Code, Income Tax Regulations, administrative rulings, and cases including research problems, and consideration of tax policies. Rose, Shipman, and Slain.

**600 P 1 or 2****Appellate Practice II**

W, Sp. 1 or 2 cr. hrs. by arrangement with instructor. Repeatable to a maximum of 2 cr. hrs. with permission of the instructor.

S or U grade given on completion of second-year Moot Court Program.

Preparation of a brief and presentation of several oral arguments; participation by second-year students as advisers in first-year Moot Court Program. Herman and Moot Court Governing Board.

**602† P 3 or 4****Legal Process**

W. 3 or 4 cl.

Comparative evaluation of law-making by private parties, courts, legislatures, and administrative agencies; retroactivity; adherence to precedent; purposes of legislation; statutory interpretation.

**603 P 3****Evidence**

A, W. 3 cl. or W, Sp. 3 cl.; 2-qr. sequence; credit given on completion of 6 cr. hrs.

Survey of rules of evidence; particularly demonstrative, testimonial, and circumstantial proof; qualification and examination of witnesses; privilege; relevancy; documents; hearsay rule and its exceptions. Callahan, Rutledge, and Slagle.

**604 P 3****Pleading**

A, Sp. 3 cl.

Pleading under codes and Federal Rules of Civil Procedure; requirements of pleadings; variance and amendments; defenses; denials and new matter; counterclaims; reply; demurrer; motions; interrogatories; joinder. Knepper, Slagle, and Wills.

**605 P 3****Commercial Paper**

W. 3 cl.

Types of commercial or negotiable paper; transfer; purchase and payment in due course, discount and security. Clovis and Nordstrom.

**606****Federal Income Taxation**

Study of federal income tax; concept of taxable gross income; deductions; reporting methods; capital gains and losses; treatment of corporations and shareholders, partnerships, and trusts.

**606.01 Federal Income Taxation P 4**

A. 4 cl.

Not open to students with credit for 606.02.

Traditional federal income taxation course with class time limited to one quarter. Rose.

**606.02 Federal Income Taxation P 3**

A, W. and W, Sp. 3 cl.; 2-qr. sequence; credit given on completion of 6 cr. hrs.

Not open to students with credit for 606.01.

Consideration of the basic material covered in 606.01 with extended coverage in certain areas, including practice and procedure, partnerships and corporations. Rose, Shipman, and Slain.

**607****Business Associations**

Forms of business organizations: planning corporate and other relationships for commercial and industrial purposes.

**607.01 Business Associations P 2-5**

A, W. or W, Sp. 2-5 cl.; 2-qr. sequence; credit given on completion of 7 cr. hrs.

Not open to students with credit for 607.02, 607.03 or 632.

Formation, financing, and governance of corporations, partnerships, and other business organizations; problems of federal corporation law; corporate acquisitions and divestitures. Schwarz, Shipman, and Slain.

**607.02 Business Associations I P 2-3**

A, W. 2-3 cl.; 2-qr. sequence; credit given on completion of 5 cr. hrs.

Not open to students with credit for 607.01 or 632.

Formation, financing, governance, and regulation of corporations, partnerships, and other business organizations; problems under the Securities Exchange Act of 1934. Kozyris.

**607.03 Business Associations II P 3**

Sp. 3 cl.

Prereq.: 607.02.

Not open to students with credit for 607.01 or 632.

Problems of the large, publicly-held corporation; federal corporate law; corporate consolidations and distributions. Kozyris.

**609 P 3****Sales**

A. 3 cl.

A study of the Uniform Commercial Code and other statutes bearing on the sale of goods in the American market. Clovis, Lawson, and Nordstrom.

**610 P 3****Secured Transactions**

Sp. 3 cl.

Emphasis on the Uniform Commercial Code; financing sale of goods, intangibles, and proceeds; validity of and perfecting security interests; priorities and remedies. Clovis, Lawson, and Nordstrom.

**611† P 4****Administration of Criminal Justice**

W, Sp. 4 cl.

Not open to students with credit for 640 or 641.

Processes of criminal justice from arrest to parole and probation; impact upon traditional practices and procedures resulting from major decisions of the Supreme Court of the United States. Herman.

**612† P 3****Admiralty Law**

Su. 3 cl.

Admiralty jurisdiction; injuries to seamen and maritime workers; bills of lading; charter parties; salvage; general average; limitation of liability.

**613 P 4****Labor Law**

A, W. 4 cl.

Not open to students with credit for 630.

Collective bargaining processes and duty to bargain; grievance arbitration; legal limitation on economic pressures, including interference with bargaining, strikes, picketing, and boycotts. Rutledge.

**614† P 3****Comparative Law—Western Europe**

W. 3 cl.

Substantive and procedural aspects of foreign legal systems in comparison with American law. Kindred.

**615 P 3****Comparative Law—Latin America**

W. 3 cl.

A comparative study of selected aspects of Latin-American and Anglo-American law. Rosenn.

**617 P 3****Estate-Gift Taxation**

W, Sp. 3 cl.

Not open to students with credit for 631.02.

Federal gift and estate taxation; federal tax practice; interrelationships of death and gift taxes with federal income taxes. Glander and R. Lynn.

**618 P 3****Insurance**

A. 3 cl.

Insurance law and practice with particular reference to fire, life, and automobile insurance; insurable interest; warranties and representations; waiver and estoppel; construction standard policies. Callahan.

**619 P 3-6****International Law**

A. or A, W. 1 or 2-qr. sequence for the minimum of 3 cr. hrs. and the maximum of 6 cr. hrs. depending on course offering.

Current problems in international law; international agreements; status of states and individuals; recognition; jurisdiction and procedural prerequisites to assertion of international claims. Quigley.

**620 P 3****Jurisprudence**

Sp. 3 cl.

Jurisprudential thought as represented by general theories of or about law; assessment of leading jural doctrines; relationship to social control policy and to legal precepts. Caldwell.

**621† P 3****Real Property Mortgages**

W. 3 cl.

Mortgages and their use as a security device in real property transactions; common mortgage provisions; methods of enforcement of rights; "equitable" mortgages. Lawson.

**622 P 3****State and Local Taxation**

Sp. 3 cl.

Legal problems arising in property, excise, income, and estate-inheritance taxation; tax administration and procedure. Glander.

**623****Federal Antitrust Law**

Prohibition of monopoly and restraint of trade by Sherman and Clayton Antitrust Acts, Federal Trade Commission Act and related statutes.

**623.01 Federal Antitrust Law P 5**

A. 5 cl.

Not open to students with credit for 623.02 or 623.03.

Condensed and basic coverage of federal antitrust law with class time limited to one quarter. Day.

**623.02 Federal Antitrust Law—Restraint of Trade P 3**

A. 3 cl.

Not open to students with credit for 623.01.

Contracts, combinations, and conspiracies in restraint of trade under the Sherman, Clayton, and Federal Trade Commission Acts, and related statutes. Day.

**623.03 Federal Antitrust Law—Monopolies and Mergers P 3**

W. 3 cl.

Not open to students with credit for 623.01.

Monopolies, attempts and conspiracies to monopolize, mergers and patent-antitrust problems under Sherman, Clayton, and Federal Trade Commission Acts and related statutes. Day.

**624† P 3****Taxation of Foreign Income**

Sp. 3 cl.

Taxation of individuals and business operating in United States and abroad; jurisdiction, income source, foreign tax credit; treaty structure; special statutory entities for foreign trade.

**625 P 3****Copyright Law**

A. 3 cl.

Protection of literary, musical, artistic, and commercial property under common law; the federal copyright statute and related legislation. Day.

**626 P 3****Law and the United Nations**

Sp. 3 cl.

Establishment of the United Nations, conditions of access, and performance of various functions in the decision process by Security Council, General Assembly and International Court. Quigley.



**627† P 3****American Legal History**

Sp. 3 cl.

Studies in history of American law and exploration of relationship between development of the legal system and rise of an industrial society. Simmons.

**628 P 3****Legal Problems of Financial Information**

A. 3 cl.

Substantive law problems involving financial information in the basic context of partnership and corporation law and the Internal Revenue Code. Rose and Shipman.

**629 P 3****Legislation**

A, Sp. 3 cl.

Roles of the lawyer in the legislative process; legislative organization, jurisdiction, and procedure; formation of legislative policy; legislative drafting, statutory interpretation. Caldwell.

**630 P 1-5****Labor Law and Practice**

A. or A, W. 1-5 cl.; 1 or 2-qr. sequence; credit given on completion of 5 cr. hrs.

Not open to students with credit for 613.

Law and practice in labor-management and union-employee relations; self-organization; unfair labor practices; arbitration; emergency disputes; public employment and union internal affairs. Bernstein.

**631 P 3****Estate Planning**

Functional integration of the legal concepts concerning transmission of individual and family wealth.

**631.01 Estate Planning**

A, W. or W, Sp. 3 cl., 2-qr. sequence; credit given on completion of 6 cr. hrs.

Not open to students with credit for 631.02.

Trusts, future interests, gifts, powers of appointment, rule against perpetuities, and related rule with limited reference to tax aspects of estate planning. Lynn.

**631.02 Estate Planning**

A, W, or W, Sp. 3 cl., 2-qr. sequence; credit given on completion of 6 cr. hrs.

Not open to students with credit for 617 or 631.01.

Intestacy succession, wills, trusts, gifts, future interests, and life insurance in estate planning with intensive analysis of federal estate gift taxation. Rose.

**632† P 3****Corporations**

A, W. or W, Sp. 3 cl., 2-qr. sequence; credit given on completion of 6 cr. hrs.

Not open to students with credit for 607.

Formation; rights and duties of directors, officers, and shareholders; derivative suits; issuance and transfer of securities. Kozyris and Spitz.

**633 P 3****Criminal Law**

A, W. or W, Sp. 3 cl., 2-qr. sequence; credit given on completion of 6 cr. hrs.

Not open to students with credit for 509.

Criminal laws as means of attaining socially desirable ends, stressing criminal behavior and handling of those who engage in that behavior. Geltner, Herman, and Quigley.

**634 P 3****Family Law I**

A. 3 cl.

The law applicable to children, including a study of agency and juvenile court treatment of dependent, neglected, abused, unruly, and delinquent children. Kindred.

**635 P 3****Family Law II**

W. 3 cl.

Problems of the marriage relationship, including marriage, annulment, divorce, custody, intra-family relationships, and relation of family members with others. Kindred.

**637 P 3****Legal History**

W. 3 cl.

Comparative studies in history of law and exploration of relationship between development of legal systems and societal structures. Murphy.

**638 P 3****Legal Problems in Real Estate Financing**

A. 3 cl.

Not open to students with credit for 621.

Mortgages and their use as security devices in real property transactions; emphasis upon various devices for financing real estate acquisitions and developments. Lawson and Murphy.

**639 P 3****Urban Housing**

A. 3 cl.

Housing needs of the urban poor considered in the light of the rights, remedies, and resources of the legal system. Simmons.

**640 P 3****Criminal Justice I**

A, W. 3 cl.

Not open to students with credit for 611.

Police practices including search, seizure, arrest, interrogation, line-ups, and entrapment. Herman and Jacob.

**641 P 3****Criminal Justice II**

Sp. 3 cl.

Study of proceedings in felonies from preliminary hearing through post-conviction remedies; double jeopardy. Herman and Rosenn.

**642 P 3****Legal Problems of the Poor**

Study of law, legal institutions, and policy issues of particular relevance to selected problems of the poor.

**642.01 Legal Problems of the Poor: Civil**

A, W. 3 cl.

Examination of the causes and effects of poverty in relation to the law, legal institutions, and public policy. Champlin.

**642.03 Legal Problems of the Poor: Corrections**

A, Sp, Su. 3 cl.

Examination of the correctional process, including sentencing, prison administration, and the parole system. Jacob.

**642.04 Legal Problems of the Poor: Crime and Delinquency**

A, W. 3 cl.

Examination of the causes and effects of crime and delinquency as they relate to criminal law processes. Jacob.

**643 P 3****Injunctions**

Sp. 3 cl.

Not open to students with credit for 642.02 and 643.02.

Requirements and uses of injunctions and other equitable remedies to redress violations of constitutional, statutory, and common law rights. Champlin.

**644 P 3****Agency and Employment**

Sp. 3 cl.

A system-descriptive approach to the common incidents of employment, partnership, and other agencies. Stain.

**645 P 3****Urban Development**

Sp. 3 cl.

Not open to students with credit for 648 or 649.

The inner city and regional planning through zoning, condemnation, and other legal devices. Fink and Simmons.

**646 P 3****Dignitary Torts**

A. 3 cl.

Legal rights and remedies developed to protect interests in reputation, privacy, and other aspects of human dignity. Geltner and Miller.

**647 P 3****Sex-Based Discrimination and the Law**

Sp. 3 cl.

Law, legal institutions, and policy issues relevant to the redress of sex-based discrimination. Constitutional, legislative, executive, and judicial avenues of redress.

**648 P 3****Land Use Planning I**

W. 3 cl.

Not open to students with credit for 645.

Techniques and consequences of limitations imposed upon use of private land by private covenant and public action; nuisance; covenants; zoning, and subdivision controls. Simmons.

**649 P 3****Land Use Planning II**

Sp. 3 cl.

Prereq.: 645 or 648.

Study of public regulatory devices for land use and development; eminent domain; planned unit development; urban renewal; official maps; new towns; open space. Simmons.

**650 P 3****Local Government Law**

W. 3 cl.

Types and organizations of local government units; intergovernmental relations; "home rule" power of Ohio municipalities; personnel; lawmaking; community planning; taxing and finance; contracts; legal liability. Fink and Simmons.

**694 P 1-6****Group Studies**

Su, A, W, Sp.

Repeatable to a maximum of 20 cr. hrs.

Group study in selected areas of the law.

**701† P 3****Advanced Legal Research**

Research techniques providing basic experience in analyzing legal questions, using appropriate publications, and in reaching competent solutions to legal problems.

**702 P 3 or 4****Restitution**

Sp. 3 or 4 cl.

Restitutionary remedies available for tort, misrepresentation, breach of contract, and for benefits conferred voluntarily, under duress or mistake, or in partial performance of contract. Murphy, Nordstrom, and Spitz.

**704 P 3****Trial Practice**

A, W, Sp.

Prereq.: 603 and 604.

State and federal procedures in civil or criminal causes; individual student practice in the trial to a jury of a civil or criminal case. Alton, Elam, Knepper, Rutledge, and Slagle.

**705 P 3****Bankruptcy**

A. 3 cl.

Methods used for the liquidation of debtors' estates, emphasizing first seven chapters of the Bankruptcy Act. Cavendish and Shipman.

**706 P 3 or 4****Conflict of Laws**

A. 3 or 4 cl.

Private law pertaining to jural relations containing one or more foreign elements; jurisdiction; foreign judgments; domicile; choice of law; torts; workmen's compensation acts; contracts; property; family law; decedents' estates. Kozyris and Miller.

**707 P 3****Administration of Decedents' Estates**

W. 3 cl.

Probate and contests of wills; jurisdiction; effect and necessity of administration; inventory and assets; contracts; sales and investments by personal representatives; claims; accounting and distribution. Wills.

**708 P 4**  
**Arbitration Law and Practice**

A. 4 cl.

Commercial and labor arbitration under Ohio and federal arbitration statutes; drafting arbitration clauses; conduct of proceedings; arbitrable issues; court enforcement or impeachment of awards. Bernstein.

**709 P 3**  
**Regulation of Security Distributions**

A. 3 cl.

Prereq.: 607 or 632.

Analysis of Security Act of 1933 and pervasive effects upon issuance of securities and transfers; study of exemptions and restrictions on transfer and value. Shipman and Slain.

**710 P 3 or 4**  
**Federal Courts**

A. 3 or 4 cl.

The Federal judicial system; jurisdiction of the district courts, courts of appeals, and United States Supreme Court. Fink.

**713 P 1-4**  
**Appellate Practice IV**

A, W, Sp. 1 to 4 cr. hrs. by arrangement with instructor.

Repeatable to a maximum of 4 cr. hrs. with permission of the instructor.

S or U grade given on completion of third-year Moot Court Program.

Procedural and substantive aspects of appellate practice; perfection of appeals; preparation of briefs and oral argument; participation by third-year students in various aspects of Moot Court Program. Herman.

**714 P 3**  
**Receivership and Reorganization**

W. 3 cl.

Prereq.: 607 or 632.

Equity receivership and corporate reorganization under Chapter X of the Bankruptcy Act; arrangements under Chapter XI of the Act. Kozyris and Shipman.

**715 P 3**  
**Advanced Federal Income Taxation**

Sp. 3 cl.

Prereq.: 606.01 or 606.02.

Advanced study of federal income taxation dealing with corporations and shareholders. Rose.

**716 P 3**  
**International Trade Regulation**

Sp. 3 cl.

Prereq.: 623.01, 623.02, or 623.03.

Extraterritorial application of United States trade regulation law, international treaties, and conventions, and trade regulation in European Common Market. Day.

**718 P 3**  
**Unfair Trade Practice**

A. 3 cl.

Protection of consumers from unfair, deceptive, or unconscionable acts or practices under common law and federal and state statutes. Day.

**719 P 4**  
**Natural Resources**

A. 4 cl.

The nature and incidents of public and private interests in water, minerals, oil and gas; conveyancing of natural resources, and mineral, oil, and gas leasing. Murphy.

**720 P 4**  
**Social Legislation**

Sp. 4 cl.

Characteristics of statutory devices and their utility in effectuating social policy with emphasis upon acts and bills dealing with employment, but including related private plans and nonemployment programs. Bernstein.

**722† P 3**  
**The Federal System**

W. 3 cl.

Allocation of authority between federal and state law and courts; congressional power over the jurisdiction of courts; litigation involving the government or its agents.

**723 P 3**  
**Food and Drug Law**

W. 3 cl.

Study of the development, administration and application of federal and state laws which regulate the manufacture, advertising, and sale of food, drugs, and cosmetics. Caldwell and Day.

**724 P 3**  
**Comparative Criminal Law and Procedure**

Sp. 3 cl.

Comparison of U.S. and Soviet criminal procedures, codes and case law, and resulting criminal justice. Quigley.

**727 P 4**  
**Regulated Industries**

Sp. 4 cl.

Explanation of legal principles relevant to the rate regulation process and an analysis of other regulatory problems in the television, transportation, and atomic industries. Kozyris and Schwarz.

**728 P 3 or 4**  
**International Transactions**

Sp. 3 or 4 cl.

Legal problems in transnational context arising from doing business abroad; investments; establishment; exchange controls; trade, licensing; extraterritoriality of regulatory legislation; international agreements; European Common Market. Kozyris and Rosenn.

**729 P 4**  
**Administrative Practice**

A. 4 cl.

Types of action before administrative boards and commissions, primary jurisdiction defining policy, judicial jurisdiction, right to trial hearing, obtaining judicial review, scope of review, evidence, decision-making. Rutledge.

### 731 P 3

#### Business Planning

A, W, or W, Sp. 3 cl., 2-qr. sequence; credit given on completion of 6 cr. hrs.

Prereq.: 607 or 632, 606.01 or 606.02; 628 recommended.

Advanced study in corporations and taxation of corporations and shareholders. Shipman.

### 732 P 3

#### Conservation Law

W. 3 cl.

Legal problems relating to the living environment; legal problems of conservation of resources such as forest, wildlife, soil, and parks. Murphy.

### 733 P 3

#### Political and Civil Rights I

A. 3 cl.

Advanced study of constitutional guarantees in contemporary social milieu; freedom of expression, association; academic freedom; advocacy and symbolic expression. Laughlin.

### 734 P 3

#### Political and Civil Rights II

W. 3 cl.

Advanced study of civil rights and legal problems of race relations in contemporary social milieu; segregation; discrimination; equal protection; separatism. Laughlin.

### 735 P 3

#### Law Journal

A, W, Sp.

Prereq.: Selection for Law Journal by editors and faculty.

Three cr. hrs. counted toward graduation requirement, but no grade awarded.

Special studies covering diverse subjects of a legal nature participated in by the group selected for work on the Law Journal. Slain.

### 736 P 3 or 4

#### Legal Profession

A, Sp. 3 or 4 cl.

Legal and ethical problems of the legal profession and the practicing lawyer, including: unauthorized practice, bar admission, group legal services, malpractice, professional organization, and discipline. Kirby.

### 737 P 3

#### Patent Law

Sp. 3 cl.

Fundamentals of substantive patent law relating to standards of patentability, patent claim interpretation, licensing, and enforcement presented in reference to patent litigation. Ladd.

### 738

#### Study and Practicums in Legal Problems of the Poor

Pursuant to the New York Court of Appeals Rules for Admission to Practice, students who enroll for more than 12 cr. hrs. may be ineligible for admission to practice in New York. No student may enroll in more than 24 cr. hrs.

Advanced study and training in performance of legal services for the poor under supervision of clinical faculty and staff attorney.

#### 738.01 Criminal Law Practicum P 3 or 6

W, Sp, Su. 3 or 6 cl., 1- or 2-qr. sequence; S or U grade given on completion of 6 cr. hrs.

Prereq. or concur.: 603 plus one or more of the following: 642.04, 642.03, 633, 640, 641, or with permission of instructor.

May not be taken simultaneously with any other practicum except 738.03.

Development of the basic knowledge and skills of criminal law practice. Jacob.

#### 738.02 Civil Law Practicum P 3 or 6

W, Sp, Su. 3 or 6 cl.; 1- or 2-qr. sequence; S or U grade given on completion of 6 cr. hrs.

Prereq. or concur.: 642.01.

May not be taken simultaneously with any other practicum except 738.03.

Development of the basic knowledge and skills of civil law practice on behalf of the poor. Champlin.

#### 738.03 Welfare Law Practicum P 2

Sp. 2 cl. S or U grade given on completion of 2 cr. hrs.

Prereq. or concur.: 796.29.

Repeatable to a maximum of 4 cr. hrs. with permission of instructor.

Supervised clinical study of welfare problems. Champlin.

#### 738.04 Juvenile Law Practicum P 2-4

W, Sp. 2-4 cl.; 1- or 2-qr. sequence; S or U grade given on completion of 4 cr. hrs.

Prereq.: None; Recommended 634, 640 and/or 641.

Study of the intricacies of the juvenile intake process, difficulties of dealing with a total family situation involving child neglect or juvenile delinquency, and substantive legal problems of the juvenile area.

#### 738.05 Criminal Appeals and Postconviction Remedies Practicum P 3

A. 3 cl.; S or U grade given on completion of the course.

Prereq. or concur.: 603 plus one or more of the following 642.04, 642.03, 633, 640, 641, or with permission of instructor.

Opened principally to students who intend to enroll in 738.01.

Supervised clinical course emphasizing the knowledge and skills needed in the criminal appellate and postconviction processes.

#### 738.06 Consumer Protection Law Practicum P 6

Su. 6 cl.; S or U grade given on completion of the course.

Prereq.: 718.

Study of specific problems of consumer fraud and deception, and participation in the investigation and prosecution of selected civil and criminal cases. Day.

### 739 P 3

#### African Law

Sp. 3 cl.

Study of selected fundamental problems of legal development in context of evolving African countries, relationship between legal change and policies of social and economic development. Kindred.

### 793 P 1-6

#### Individual Studies

By special arrangement with the Dean's office, special problems or projects may be taken for credit under the supervision of members of the faculty. The credit granted varies in proportion to the magnitude of the project. In general, assignment of special problems will be limited to instances of exceptional student specialization, scheduling difficulties, and curricular irregularity.

### 794 P 1-6

#### Group Studies

Su, A, W, Sp.

Repeatable to a maximum of 20 cr. hrs.

Group study in selected areas of the law.

### 796 P 1-4

#### Seminars

A, W, Sp. 1-4 cl.; 1 or 2-qr. sequence; for sequence seminar, credit given on completion of total cr. hrs. assigned.

Small group study and training in legal and non-legal research, expository writing, and various litigious and non-litigious functions of the practicing lawyer.

#### 796.01 Antitrust Law and Economics

Prereq.: 623.

Evaluation of domestic antitrust law on the basis of current economic theories. (Interdepartmental Seminar of the Department of Economics and the College of Law.)

#### 796.02 Antitrust Law and International Cartelization

Prereq.: 623.

Application of domestic antitrust policy to foreign operations of American corporations.

#### 796.03 Constitutional Problems

Advanced constitutional questions, involved in evolution of judicial review, intergovernmental relationships, protection of civil liberties, special problems under Ohio Constitution.

#### 796.04 Social Legislation

Federal wage and hour legislation, including: nature of employment relation; Fair Labor Standards Act; exemptions; compensable time; overtime on fluctuating workweek; child labor.

#### 796.05 Legal Problems of Foreign Trade and Investment

Problems encountered by American business enterprises engaged in foreign trade or investment.

#### 796.06 Legal Regulation of Business Practice

Regulation of competitive practices through legislative, administrative, and judicial action; equality of opportunity for small business; the Robinson-Patman Act.

#### 796.07 Legal Regulation of Devolution of Property

Socio-legal problems raised by devolution of wealth through such arrangements as public welfare programs, union welfare funds, insurance, foundations, charitable trusts, and pension trusts.

#### 796.08 Problems in the Law of Evidence

Prereq.: 603.

Advanced evidentiary questions involved in preparation for and trial of cases.

#### 796.09 Problems in Local Government Finance

Taxing by and financing of local governmental units, including power of and procedure for taxing, expending funds, financing improvements or services.

#### 796.10 Problems in Public Contracts

Types of government contracts; governmental authority to make contracts; limitations; advertising; bids and awards; formal requisites; standard clauses; contractors' bonds; performance and termination; liabilities.

#### 796.11 The Functional Approach to Law

Analysis of certain rules and situations to which they relate; evaluation of rules and of assumptions of cause and effect made as to those rules.

#### 796.12 Legal and Economic Problems in State and Local Taxation

Prereq.: 622.

State taxation and intergovernmental tax relations in terms of law and fiscal economics. (Offered in cooperation with the Department of Economics.)

#### 796.13 Medical-Legal Problems

Conflict in concept between disciplines of law and medicine in matters of causation, injury, disability, prognosis, aggravation and re-injury related to their use in proof of such elements in litigation.

#### 796.14 The Individual and His Government

Government powers in democratic and totalitarian countries; relation of power to will of people; justice and fair hearing; personal freedoms surviving legislative and executive encroachments.

#### 796.15 Comparative Labor Law

Prereq.: 613 or 630.

Problems in American labor law viewed from the standpoint of both American and foreign law; collective bargaining; the use of economic force; internal and inter-union affairs.

#### 796.16 Right of Privacy

Individual's interests in freedom from publicity and in physical seclusion; particularly legal response to social and technological changes which threaten these interests.

#### 796.17 Regulated Industries

Principal regulatory agencies, both federal and state, with respect to licensing, rate-making, mergers, and general supervision of business practices.

#### 796.18 International Law of Sharable and Strategic Resources

Processes of interaction, claim, and decision with respect to resources largely open to use by all states, including the ocean, "outer" space, air space, international rivers, canals, and polar areas.

#### 796.19 Selected Problems in Criminal Law and Procedure

Purposes and effects of punishment; wiretapping; Uniform Arrest Act; right to counsel; habeas corpus and other postconviction remedies; treatment of criminal cases by mass communications.

#### 796.20 Research Seminar in Law

Repeatable to a maximum of 6 cr. hrs.

Topics will change as specially scheduled in any quarter.

#### 796.21 Legal Controls of the Economy

Study of State and Federal legislation affecting economic activity, including employment acts, antipoverty legislation, tariffs, financing laws, and legal basis of the Federal Reserve System.

#### 796.22 The Legal Implementation of Social Policy

Interdisciplinary research and field work in institutions protective of children.

**796.23 Jurisprudential Approaches to Decision Making**

Considerations of conceptions of the role of law and lawyers in decision processes, with emphasis upon clarification of goal values, drawing on contemporary behavioral and communications sciences, in order to develop problem-solving tools and procedures.

**796.24 Syntactic Analysis and Other Tools in Statutory Drafting and Interpretation**

A study of the role of the legislature in authoritative law-making with emphasis upon the need for a contextual approach to problems of interpretation, and the consideration of modern syntactic analysis in statutory drafting and interpretation.

**796.25 Problems of Administration Law**

Prereq.: 729 recommended.

An examination in detail of some of the more troublesome aspects of contemporary executive and administrative operations at federal and state levels.

**796.26 Jury Trial**

An examination of the role of juries including jury selection, standard instructions, special verdicts, law and fact, myths of jury trial and powers of juries vis-a-vis powers of administrative bodies.

**796.27 International Criminal Law**

Jurisdiction of tribunals over individuals committing acts considered criminal under international law but not local law; defenses urged; examination of piracy and war crimes.

**796.28 Socio-Economic Environment of Law**

An examination of selected aspects of the socio-economic environment which affect the scope, content, and effectiveness of legal practice, rules and institutions.

**796.29 Welfare Law**

Legal and policy problems of welfare law and welfare administration.

**796.30 Urban Studies**

Legal problems confronting inhabitants of major urban cities; effect on urban redevelopment; legal rights of services for poor.

**796.31 Housing and Urban Development**

Operation of and legal problems confronting governmental agencies concerned with housing and urban development in local communities.

**796.32 Insurance**

Organization and regulation of insurance carriers and marketing arrangements; rate-making; investment practices; reinsurance; solvency, rehabilitation and liquidation of companies.

**796.33 Jurimetrics**

Study of the use of mathematical techniques and computer systems in legal analysis, legal research, and judicial administration.

**796.34 International Legal Problems of Community Health**

Prereq.: 619 or 626.

Policy alternatives of United States and/or international organizations for the solution of selective health problems, e.g. population explosion, famine, medical brain drain, and environmental pollution.

**796.35 Law and Economic Development**

Study of the relationship between legal institutions and economic development; comparison of economic growth of the United States and developing nations.

**796.36 Institutions of Legal Change**

Examination and analysis of public and private institutions which play significant role in change of law in United States.

**796.38 Legal Aspects of Totalitarian Government**

Study of restrictions and impact of citizens' human, civil, political rights in totalitarian regimes; comparison with U.S. theory and practice; analysis of international agreements, policy.

**796.39 Business Planning**

Planning and drafting in field of business association; principally concerned with problems in general and limited partnerships, business trusts, and closely held corporations.

**796.40 Estate Planning**

Planning an effective and economical gift distribution of property interests; consideration of techniques and restrictions suggested by law of property, wills, future interests, insurance, and taxation.

**796.41 Federal Tax Planning**

Prereq.: 606.

Tax problems in business organizations, corporations, partnerships, and individual estates.

**796.42 General Legal Planning**

Representative types of personal and business transactions which confront general practitioner, including contracts, partnership agreements, purchase agreements, sales agreements, deeds, wills, and trusts.

**796.43 Planning Through Negotiation**

Planning negotiations; weighing legal, economic, and social factors and use of techniques for attainment of objectives.

**796.44 Legislative Planning**

Prereq.: 629.

Repeatable to a maximum of 6 cr. hrs.

Role of lawyer in advocating or opposing state and federal legislation; problems selected from past and current proposals before legislature.

**796.45 Planning Seminar in Law**

Repeatable to a maximum of 6 cr. hrs.

Topics will change as specially scheduled in any quarter.

**796.46 Legal Administration of Natural Resources**

Prereq.: 719 or 732 recommended.

Study of administration techniques for control and conservation of natural resources; consideration of problems of regulation, finance, management, and taxation.

**796.47 Securities Regulation**

Must enroll to a maximum of 4 cr. hrs.

Prereq.: 709.

Study of recent legal developments affecting security trading market, brokers, exchanges and NASD, investment companies, and other institutional investors.

**796.48 Trade Regulation**

Must enroll to a maximum of 6 cr. hrs.

Prereq.: By designation of instructor.

Study of current problems of trade regulations, e.g. antitrust, unfair trade practices, patents, food and drug law.

**796.49 Problems in Torts and Other Deprivations**

Must enroll to a maximum of 6 cr. hrs.

Study in frontier areas of torts (no-fault compensation plans) and related areas of remedies for deprivations of well-being and respect.

**796.50 Legal Profession**

Selected topics on the study of the legal profession with emphasis on behavioral sciences approaches including comparisons with other occupations and professions.

**796.51 Social and Environmental Litigation**

Prereq.: 710 and 719 recommended.

Study of impact of law on social and environmental problems with emphasis on procedure and choice of remedies.

**796.52 Federal Criminal Law**

The relationship of federal and state criminal law; historical role and specialized problems of federal criminal law.

**796.53 Law in the Soviet Union**

Comparison of Soviet and United States law and legal institutions in selected areas, such as personal freedoms; regulation of commerce.

**796.54 The Mentally Retarded and the Law**

Study and interdisciplinary research into special and legal problems of the mentally retarded.

**796.55 Consumer Credit**

Consumer credit; statutory and judicial regulation, with particular emphasis on the problems of the poor consumer.

**797 P 1-5****Interdepartmental Seminars**

Su, A, W, Sp.

(See under Interdepartmental Seminars.)

- a.† Professional Responsibilities and the Great Issues of Our Times. W, Sp.

## Linguistics

Office: 256 Dieter Cunz Hall of Languages, 1841 Millikin Road

Associate Professor Geis (Chairman); Professors Lehisté and Zwicky; Associate Professors Callaghan, Drachman, and Stampe; Assistant Professors Dowty and Jeffers.

See also the course listings in English, the foreign languages, Romance Linguistics.

**201 U 5****Introduction to Language**

A, W, Sp. 5 cl.

A general survey of language and languages, and the ways available to study them, with English as the focal language.

**221 U 5****Elementary Hindi**

A. 5 cl., 3 lab. hrs.

Sound and writing systems, morphological patterns, basic sentences with brief dialogues and texts.

**222 U 5****Elementary Hindi**

W. 5 cl., 3 lab. hrs.

Prereq.: 221.

Continuation of 221; reading of simple materials.

**223 U 5****Intermediate Hindi**

Sp. 5 cl.

Prereq.: 221 and 222.

Oral and written practice; reading of contemporary prose and poetry.

**224 U 5****Intermediate Hindi**

A. 5 cl.

Prereq.: 223 or one yr. of elementary Hindi.

Oral and written practice; continuation of Hindi grammar and reading of contemporary literary texts.

**271 U 5****Elements of Psycholinguistics**

W. 5 cl.

Prereq.: 201.

Linguistics and the structure, acquisition, function, and malfunction of language.

**285† U 5****Language Change and Development**

Sp. 5 cl.

Prereq.: 201.

Survey of the kinds of linguistic change; discussion of the external influences (social, cultural, political, etc.) that affect the historical development of languages.

**600 U G 5****Phonetics**

A. 5 cl.

Prereq.: 601, concur. registration in 601, or an equiv. course in linguistics or phonetics.

Principles of articulatory phonetics, with some discussion of acoustic phonetics; practice in the production, recognition, and transcription of sounds in various languages of the world.

**601 U G 5****Introduction to Linguistics**

Su, A, W, Sp. 5 cl.

A broad introduction to general linguistics: survey of phonological, morphological, syntactic, and semantic analysis, and of historical and comparative linguistics.

**602 U G 4****Introduction to Syntax**

W, Sp. 3 cl., 2 lab. hrs.

Theories of Syntax; principles of syntactic description.

**602.01 Introduction to Syntax I**

W.

Prereq.: 601.

**602.02 Introduction to Syntax II**

Sp.

Prereq.: 602.01.

**603 U G 4****Introduction to Phonology**

W, Sp. 3 cl., 2 lab. hrs.

Introduction to phonological analysis and the principles governing the structure, acquisition, and change of phonological systems; survey of major phonological theories.

**603.01 Introduction to Phonology I**

W.

Prereq.: 600 and 601.

**603.02 Introduction to Phonology II**

Sp.

Prereq.: 603.01.

**609 U G 3****Morphology**

A. 3 cl.

Prereq. or concur.: 601, or permission of instructor.

Designed to give students a structural approach to grammatical analysis, and to delineate the evolution from structural to transformational analysis.

**611 U G 5****Introduction to Historical Linguistics**

Sp.

Prereq.: 601.

Introduction to the methods and principles of historical linguistics.

**621\* U G 5****Elementary Sanskrit**

A.

Prereq.: 601 and permission of instructor.

Introduction to Indo-European, Indic, and Sanskrit; reading of introductory texts.

**622\* U G 5****Classical Sanskrit**

W.

Prereq.: 621 or permission of instructor.

Reading of classical Sanskrit texts.

**623\* U G 5****Topics in Indic Linguistics**

Sp.

Prereq.: 622 or permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Possible topics include advanced classical Sanskrit, introductory Vedic Sanskrit, Indo-Iranian or Indo-Aryan linguistics, or studies in the ancient Indian grammarians.

**650****Field Methods in Linguistics****650.01 Field Methods I****U G 4**

W. 4 cl.

Prereq.: 600 or permission of instructor.

Methodology for determining the phonological system of a previously unknown language through the use of a native informant.

**650.02 Field Methods II****U G 3**

Sp. 3 cl.

Prereq.: 650.01.

Methodology for determining the morphological system of a previously unknown language through the use of a native informant.

**671† U G 5****Psycholinguistics**

Sp. 4 cl.

Prereq.: 603.02.

The contribution of linguistic theory to the study of the acquisition, maturation, and functioning of language skills. Drachman.

**672 U G 3-5****Language Description**

A, W, Sp. 3-5 cl.

Prereq.: 601.

Repeatable to a maximum of 30 cr. hrs.

Informant techniques and (if available) textbooks and published linguistic analyses are employed in analyzing and describing a language.

**673 U G 5****History of Linguistics**

Sp. 5 cl.

Prereq.: 601.

Historical survey of views on language; examination of linguistic thought in historical periods, or of writings on single topics in diverse periods and traditions.

**681†\* U G 5****Algebraic Linguistics**

W. 5 cl.

Prereq.: 601 and permission of instructor.

Formal properties of grammar and automata; relations between linear, context-free and context-sensitive grammars and finite, pushdown-storage and linear-bounded automata; properties of transformational grammars. Reeker.

**685 U G 3****Languages in Contact**

W. 3 cl.

Prereq.: 601.

Study of the effects of language contact on the structure of the involved languages; of the characteristics of the individuals and communities involved in language contact.

**693 U G 1-5****Individual Studies**

Su, A, W, Sp.

Prereq. or concur.: 601 or permission of instructor.

Repeatable to a maximum of 40 cr. hrs.

**694 U G 1-5****Group Studies**

Su, A, W, Sp.

Prereq.: 601.

Repeatable to a maximum of 30 cr. hrs.

Study of topics not regularly scheduled for seminars in linguistics, under the direction of a staff member.

**695 U G 5****Seminar in Anthropological Linguistics**

Sp.

Prereq.: Anthro. 575 or permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Callaghan.

**702 U G 5****Practicum in Syntax**

A. 5 cl.

Prereq.: 602.02.

Argumentation and methodology in syntax; extensive critical reading accompanied by grammar construction and problem solving.



**H783 U 3-5**

**Honors Course**

Su, A, W, Sp.

Prereq.: 4th yr. standing and the completion of departmental Honors requirements with a grade of A in at least half of the Linguistics courses, including approved related courses; permission of instructor under whose supervision the work is to be completed and the Arts and Sciences Honors Committee.

At least 2 quarters are required of candidates for the degree Bachelor of Arts **with distinction** in Linguistics.

Repeatable to a maximum of 15 cr. hrs.

Informal conferences to allow full scope to the initiative of the student, who will prepare an Honors thesis in consultation with the instructor.

**795 U G 3-5**

**Seminar in Linguistics**

A, W, Sp. 3-5 cl.

Prereq.: 602 and 603 or permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

A selected group study, with emphasis on individual writing and presentation.

**801 G 5**

**Historical Linguistics I**

A. 5 cl.

Prereq.: 601.

An introduction to the methods, conventions, and literature of comparative-historical linguistics with primary attention to the comparison and reconstruction of Indo-European phonological systems.

**802 G 5**

**Historical Linguistics II**

W. 5 cl.

Prereq.: 801.

Advanced work in the comparison and reconstruction of morphological, and syntactic systems, primarily Indo-European; detailed examination of some of the results of past and current scholarship.

**803 G 5**

**Topics in Indo-European**

A, W, Sp. 5 cl.

Prereq.: 802.

Repeatable to a maximum of 30 cr. hrs.

Study of various Indo-European languages and language families and exploration in depth of specific problems in Indo-European grammar.

**812 G 5**

**Seminar in Semantics**

Sp. 5 cl.

Prereq.: 602.02; a course in symbolic logic recommended.

Accounts of semantic judgments in languages, especially within the theory of generative grammar; relationships between syntax, semantics, and language use.

**820 G 5**

**Seminar in Syntax**

W.

Prereq.: 602.02.

Repeatable to a maximum of 15 cr. hrs.

Advanced topics in syntactic analysis.

**821 G 5**

**Seminar in Phonology**

W.

Prereq.: 603.02.

Repeatable to a maximum of 15 cr. hrs.

Advanced topics in phonological analysis.

**822 G 5**

**Seminar in Historical Linguistics**

A.

Prereq.: 802 or permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Advanced topics in methods and principles of diachronic analysis.

**825 G 5**

**Seminar in Advanced Phonetics**

W. 3 cl., 2 lab. hrs.

Prereq.: 600, 601, and permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Study of specific problems in articulatory and acoustic phonetics at an advanced level.

**993 G 1-5**

**Individual Studies**

Su, A, W, Sp. Arr.

Prereq.: Permission of instructor.

Repeatable to a maximum of 30 cr. hrs.

Assigned reading and individual research.

**999 G Arr.**

**Research in Linguistics**

Su, A, W, Sp.

Research for thesis purposes only.

## Mathematics

Office: 150 Mathematics Building, 231 West 18th Avenue

**Professors** Ross (Chairman), Ahlswede, Baishanski, Bojanic, Colson, Davis, Drobot, Krieger, N. Levine, R. Levine, Mickle, L. Miller, Ray-Chaudhuri, Reeves, Riner, Saltzer, Sucheston, Woods, and Zassenhaus; **Associate Professors** Allen, H. Brown R. Brown, Carroll, Cronheim, Dean, Demana, Dowling, Eustice, Ferrar, Glover, Hsia, Huneke, James Leitzel, Joan Leitzel, Lu, Madam, McWorter, Meyers, Mislin, Papangelou, Purts, Riedl, Robertson, J. Scheick, Sehgal, Tull, Walum, Wilson, Wyman, Yaqub, Zilber, and Zimering; **Assistant Professors** Baumann, Buoncristiani, B. Divis, Z. Divis, Elbrink, B. Elkins, J. Elkins, Gerlach, Gold, Harada, R. Johnson, W. Johnson, Koehl, Lin, Mader, L. Miller, Parrott, Ralley, S. Scheick, Schultz, Schwartzbauer, Silver, Vuilleumier, Waits, and Wong; **Instructor** Addison.

**101**

**Basic Mathematics**

Not open to students with credit for any Math. course except 180.

**101.01 Basic Mathematics I**

**U 3**

Su, A, Sp.

Prereq.: Placement on basis of OSU Math. Placement Test.

A review of the elements of basic high school algebra using programmed materials; topics include sets, fundamental properties of numbers, graphing, equations, functions, factoring polynomials.

**101.02 Basic Mathematics II** U 2

Su, A, W, Sp.  
Prereq.: 101.01.

A review of the elements of basic high school algebra using programmed materials; topics include rational expressions, quadratic equations, inverse functions, exponential and logarithmic function.

**105** U 5

**Principles of Mathematics I**

Su, W, Sp. 5 cl.

Prereq.: Elem. Educ. standing and Math. 101 or satisfactory score on OSU Math. Test.

Development of basic ideas on arithmetic, algebra, and geometry through a study of the structure of selected mathematical systems.

**106** U 5

**Principles of Mathematics II**

A, Sp. 5 cl.

Prereq.: 105 or permission of dept.

Continuation of 105.

**107** U 5

**Geometry for Elementary Teachers**

Su, A. 5 cl.

Prereq.: 105 or permission of department.

Selected topics in geometry appropriate for prospective elementary school teachers.

**108** U 5

**Introduction to Mathematics I**

A. 5 cl.

Prereq.: Open to freshmen who qualify for Level I in English Placement, but who do not qualify for Math. 151 or higher on the basis of the OSU Math. test. Exceptions may be made by special permission of the Department of Mathematics.

Introduction to basic ideas of mathematics for students in humanities, life, and social sciences.

**109** U 5

**Introduction to Mathematics II**

W. 5 cl.

Prereq.: 108.

**110** U 5

**Introduction to Mathematics III**

Sp. 5 cl.

Prereq.: 109.

**115**

**Mathematics for the Behavioral, Economic, and Social Sciences**

A, W, Sp.

Topics in mathematics with applications to the non-physical sciences, including analytic geometry, calculus, linear algebra, and linear programming; applications.

**115.01 Algebra** U 3

Prereq.: 101 or at least Level 3 placement on OSU Math. Test or permission of instructor.

Not open to students with credit for 116, 120.01, 120.02, 121, 150, 159.01, or 159.02.

Basic properties of real numbers, graphing, functions, and relations.

**115.02 Elementary Linear Algebra** U 2

Prereq. or concur.: 115.01, 120.01 or 159.01, or permission of instructor.

Not open to students with credit for 116.

Basic topics from linear algebra and linear programming.

**115.03 Calculus with Economic Applications I** U 3

Prereq.: 115.02 or permission of instructor.

Not open to students with credit for 117.

The derivative, economic applications of the derivative.

**115.04 Calculus with Economic Applications II** U 2

Prereq.: 115.03 or permission of instructor.

Not open to students with credit for 117.

Logarithmic and exponential functions, the integral, economic applications of the integral.

**116** U 5

**Mathematics for the Behavioral, Economic, and Social Sciences I**

Su, A, W, Sp. 5 cl.

Prereq.: 101 or satisfactory score on OSU Math. test.

Not open to students with credit for 115.01, 115.02, 121, or 150, or Math. courses having these as prereqs.

The sequence 116, 117 treats topics in mathematics with applications to the non-physical sciences. Topics will include analytic geometry, calculus, linear algebra, linear programming, and graph theory; applications.

**117** U 5

**Mathematics for the Behavioral, Economic, and Social Sciences II**

Su, A, W, Sp. 5 cl.

Prereq.: 116, 121, 150, 115.01, 120.01, or 159.01 or equiv.

Not open to students with credit for 115.03 or 115.04.

A continuation of 116.

**118** U 5

**Mathematics for the Behavioral, Economic, and Social Sciences III**

Sp.

Prereq.: 117 and permission of instructor.

Continuation of 117.

**120**

**Mathematics for the Business, Social, and Biological Sciences**

Su, A, W, Sp.

Introduction to calculus, probability, and statistics.

**120.01 Algebra** U 3

Prereq.: At least Level 2 placement on OSU Math. Test or at least a grade of C in 101, or permission of instructor.

Not open to students with credit for 115.01, 121, or 159.01.

Basic properties of real numbers, graphing, functions, and relations.

- 120.02 Calculus I** U 2  
Prereq. or concur.: 115.01, 120.01, or 159.01, or permission of instructor.  
Not open to students with credit for 121.  
Introductory differential calculus.
- 120.03 Calculus II** U 2  
Prereq.: 120.02 or permission of instructor.  
Not open to students with credit for 122.  
Differential calculus, series.
- 120.04 Calculus III** U 3  
Prereq.: 120.03 or permission of instructor.  
Not open to students with credit for 122.  
Integral calculus.
- 120.05 Descriptive Statistics and Finite Probability** U 2  
Prereq.: 120.04 or permission of instructor.  
Not open to students with credit for 123.  
Descriptive statistics, random variables, and probability in the discrete case.
- 120.06 Probability and Statistics** U 3  
Prereq.: 120.05 or permission of instructor.  
Not open to students with credit for 123.  
Probability, random variables, distribution functions, estimation of parameters, tests of hypotheses and nonparametric statistical inference.

**121 U 5**  
**Mathematics for the Business, Social, and Biological Sciences I**  
Su, A, W, Sp. 5 cl.  
Prereq.: Satisfactory score on OSU Placement Test or at least a C in Math. 101.  
Not open to students with credit for 115.01, 116, 120.01, 120.02, or 150 or Math. courses having these as prereqs.  
Algebra, introductory differential calculus.

**122 U 5**  
**Mathematics for the Business, Social, and Biological Sciences II**  
Su, A, W, Sp. 5 cl.  
Prereq.: 121.  
Not open to students with credit for 120.03 or 120.04.  
Differential and integral calculus, series.

**150 U 5**  
**Algebra and Trigonometry**  
Su, A, W, Sp. 5 cl.  
Prereq.: 101 or satisfactory score on OSU Math. test.  
Not open to students with credit for 115.01, 116, 121, 159.01, or 159.02 or Math. courses having these as prereqs.  
Inequalities, functions, graphs, exponential, logarithmic and trigonometric functions and their graphs, complex numbers, inverse functions.

**151 U 5**  
**Calculus and Analytic Geometry**  
Su, A, W, Sp. 5 cl.  
H151 (honors) may be available to students enrolled in a college honors program; others with permission of dept.  
Prereq.: 150 or Level I Placement on OSU Math. test.  
Not open to students with credit for 159.03 or 159.04.  
Lines, slopes, derivatives, limits, differentiation, rules, mean-value theorem, applications of derivatives to: curve sketching, maxima and minima, linear motion, related rates, approximations, conics.

**152 U 5**  
**Calculus and Analytic Geometry**  
Su, A, W, Sp. 5 cl.  
H152 (honors) may be available to students enrolled in a college honors program; others with permission of dept.  
Prereq.: 151.  
Continuation of 151. Approximating areas, the integral, integration, formulas, applications of integration, inverse functions, logarithmic and exponential functions, hyperbolic functions, and integration techniques.

**153 U 5**  
**Calculus and Analytic Geometry**  
Su, A, W, Sp. 5 cl.  
Prereq.: 152.  
Continuation of 152. Polar coordinates, rotation of axes, vectors, velocity, acceleration, space vectors and three dimensional analytic geometry, cylindrical, and spherical coordinates; linear systems, matrices, and characteristic values.

**159**  
**Calculus and Analytic Geometry**  
Su, A, W, Sp.  
Topics include functions, limits, differential calculus, conics and integral calculus; applications.

**159.01 Algebra** U 3  
Prereq.: 101 or Level 2 placement on OSU Math.  
Test or permission of instructor.  
Not open to students with credit for 115.01, 120.01 or 150.  
Basic properties of real numbers, graphing, functions, and relations.

**159.02 Elementary Functions**  
Prereq. or concur.: 115.01, 120.01 or 159.01, or permission of instructor.  
Not open to students with credit for 150.  
Exponential, logarithmic, trigonometric and inverse trigonometric functions, and complex numbers.

**159.03 Calculus and Analytic Geometry I** U 3  
Prereq.: 159.02 or permission of instructor.  
Not open to students with credit for 151.  
Limits and continuity and the derivative.

**159.04 Calculus and Analytic Geometry II** U 2  
Prereq.: 159.03 or permission of instructor.  
Not open to students with credit for 151.  
Basic properties of differentiable functions and applications of the derivative.

**159.05 Calculus and Analytic Geometry III** U 3  
Prereq.: 159.04 or permission of instructor.  
Not open to students with credit for 152.  
Approximating areas, the integral, integration, applications of the integral, and exponential and logarithmic functions.

**159.06 Calculus and Analytic Geometry IV** U 2  
Prereq.: 159.05 or permission of instructor.  
Not open to students with credit for 152.  
Inverse trigonometric functions, hyperbolic functions, and techniques of integration.

**H163 U 5**  
**Calculus**  
Sp.  
Prereq.: 152 and permission of dept.

163, 264, 265, substitute for 153, 254, 550, and 551.

A rigorous treatment of vector spaces and limits, continuity and differentiability of multi-variable functions.

### 160 U 5

#### Insights into Mathematics

A, W, Sp. 5 cl.

Prereq.: Permission of dept.

Not open to students who need mathematics as a tool.

This is a liberal arts course intended to involve students with mathematics; topics covered will vary with the instructor.

### H190 U 5

#### Elementary Analysis I

A. 5 cl.

Prereq.: Permission of dept.

This sequence substitutes for Math. 151, 152, 153, and 550.

Special course sequence for superior students.

### H191 U 5

#### Elementary Analysis II

W. 5 cl.

Prereq.: Permission of dept.

Continuation of 190.

### H192 U 5

#### Elementary Analysis III

Sp. 5 cl.

Prereq.: Permission of dept.

Continuation of 191.

### 194 U 2-5

#### Special Topics in Mathematics

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Designed to give groups of students an opportunity to pursue special studies not otherwise offered.

### 205 (545) U 5

#### Applications of Mathematics

W, Sp. 5 cl.

Prereq.: Ed. standing and 152 or Statistics 421.

Approximately half of the course will be devoted to a study of probability and statistics; other topics will be chosen to illustrate applications of mathematics.

### 221 U 5

#### Mathematics for the Business, Social, and Biological Sciences IV

A.

Prereq.: Permission of instructor.

Continuation of 123.

### 254 U 5

#### Calculus and Analytic Geometry

Su, A, W, Sp. 5 cl.

Prereq.: 153.

Continuation of 153. Partial derivatives, multiple integrals, infinite series.

### 255 U 5

#### Differential Equations and Their Applications

Su, A, W, Sp. 5 cl.

Prereq.: 254.

Not open to students with credit for 556.

Ordinary differential equations with particular emphasis on linear differential equations, systems of differential equations, applications to electrical, mechanical, and chemical systems.

### H264 U 5

#### Calculus

A.

Prereq.: 163.

A rigorous treatment of differentials, Jacobians, line integrals, multiple integrals, and Fubini's theorem.

### H265 U 5

#### Calculus

W.

Prereq.: 264.

Stokes' theorem, Green's theorem, changes of variables, implicit and inverse function theorems.

### H290 U 5

#### Linear Algebra

A, Sp. 5 cl.

Prereq.: 192.

Vector spaces, linear transformations, quality, multilinear functions, determinants, exterior products, matrices, eigenvalues, eigen vectors canonical forms, linear manifolds, quadratic forms, inverse product spaces.

### H291 U 5

#### Functions of Several Variables I

W. 5 cl.

Prereq.: 290 and permission of dept.

Topology of n-space; convexity, differentiation, maxima and minima, inverse and implicit function theorems.

### H292 U 5

#### Functions of Several Variables II

Sp. 5 cl.

Prereq.: 291 and permission of dept.

Lebesgue integral; manifolds and forms in n-space; integration on manifolds; Stokes and divergence theorem.

### 294 U 2-5

#### Special Topics in Mathematics

A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

Designed to give groups of able students an opportunity to pursue special studies not otherwise offered.

### 415 U 5

#### Ordinary and Partial Differential Equations

W, Sp. 5 cl.

Prereq.: 254.

Ordinary, partial, linear, and non-linear differential equations, Fourier series, boundary value problems, eigen-value theory, and Bessel functions.

**416 U 5**  
**Vector Analysis and Complex Variables**

A, Sp. 5 cl.  
Prereq.: 254.

Vector algebra and vector operators, line integrals, analytic functions, complex integral theorems, power series, residues, and conformal mapping.

**450 U 5**  
**Intermediate Analysis**

A, Sp. 5 cl.  
Prereq.: 254.

Open only to students enrolled in secondary education. Introduction to analysis; development of the real numbers, limits, sequences and series, derivatives, integrals.

**471 U 4**  
**Matrices and Linear Algebra**

W, Sp. 4 cl.  
Prereq.: 153.

Not open to students with credit for H290 or 571. Matrices, systems of equations,  $R^n$ , determinants, vector spaces; applications.

**501 U G 4**  
**Fundamentals of Mathematics I**

A. 4 cl.

Prereq.: Permission of instructor.

Not open for graduate credit to majors in Math.

Emphasis on fundamentals of mathematics and designed for advanced students from areas not requiring intensive mathematical training. Topics include algebra, the number system, induction, theory of equations, progressions, combinations, and permutations, probability, determinants and matrices, inequalities, analytic geometry, differential and integral calculus.

**502 U G 4**  
**Fundamentals of Mathematics II**

W. 4 cl.

Prereq.: 501.

A continuation of 501.

**503 U G 4**  
**Fundamentals of Mathematics III**

Sp. 4 cl.

Prereq.: 502.

A continuation of 502.

**504 U G 5**  
**History of Mathematics**

A, W. 5 cl.

Prereq.: Ed. standing and 505 or 507 or permission of instructor.

Development of mathematics from primitive origins to present form; topics include: development of arithmetic, algebra, geometry, trigonometry, and calculus.

**505 U G 5**  
**Elementary Linear Algebra for Secondary School Teachers**

A, W. 5 cl.

Prereq.: Ed. standing and 254.

Fundamentals of linear algebra with emphasis on matrix algebra determinants, systems of linear equations, rank, vector spaces, and linear transformations.

**506 U G 5**  
**Elementary Abstract Algebra for Secondary School Teachers**

W, Sp. 5 cl.

Prereq.: 505.

An introduction to abstract algebra with topics from number theory; elementary ring, field, and group theory.

**507 U G 5**  
**Advanced Geometry I**

A, W. 5 cl.

Prereq.: 152.

Advanced topics from Euclidean Geometry.

**512 U G 3**  
**Partial Differential Equations and Boundary Value Problems**

A, W. 3 cl.

Prereq.: 255 or 556.

Not open to students with credit for 412 or 557.

Among the topics considered are: Fourier series, orthogonal relations, vibrating string, steady state heat, Laplace transform, and applications.

**513 U G 3**  
**Vector Analysis for Engineers**

A, W. 3 cl.

Prereq.: 255 or 556.

Not open to students with credit for 413 or 551.

Vector algebra, vector operators, line integrals, vector integral theorems, curvilinear coordinates; applications.

**514 U G 3**  
**Complex Variables for Engineers**

W, Sp. 3 cl.

Prereq.: 513 or prereq. or concur. Elec. E. 510.

Not open to students with credit for 414.

Introduction to complex variables, analytic functions, complex integral theorems, power series, residues, conformal mapping.

**530 U G 5**  
**Probability I**

A. 5 cl.

Prereq.: 254.

Combinatorial probability, examples of distributions, expectation, variances, generating functions, laws of large numbers, central limit theorem.

**531 U G 5**  
**Probability II**

W. 5 cl.

Prereq.: 530.

Continuation of 530; markov chains, stochastic processes.

**545 U G 5****Mathematical Logic I**

W. 5 cl.

Prereq.: 153 or permission of instructor.

A first course in the study of formal logical systems and their applications to the foundations of mathematics; topics include: definition of mathematical proof; number theory, set theory, and analysis formalized within the predicate calculus; theorems of Gödel and Church; recursive function theory and idealized digital computers.

**546 U G 5****Mathematical Logic II**

Sp. 5 cl.

Prereq.: 545.

A continuation of 545.

**550 U G 5****Advanced Calculus I**

Su, A, W, Sp. 5 cl.

Prereq.: 254 or permission of chairman.

A rigorous presentation of limits, derivatives, mean value theorems, definite integrals, sequences, and series.

**551 U G 5****Calculus of Several Variables****551.01 Vector Analysis**

A, Sp. 5 cl.

Prereq.: 254.

Not open to students with credit for 416, 513, 551, or 551.02.

Not recommended for Math. majors.

Vector operations in three dimensions, vector operators, surface area, the theorem of Green and Stokes, the divergence theorem; applications.

**551.02 Advanced Calculus II**

Su, A, W, Sp. 5 cl.

Prereq.: 550.

Not open to students with credit for 513 or 551.

A continuation of 550 for functions of several variables and vector analysis.

**552 U G 5****Introduction to the Theory of Functions of a Complex Variable I**

Su, W. 5 cl.

**552.01 Complex Variable I**

H552.01 (Honors) may be available to students enrolled in a college Honors program; others by permission of dept.

Prereq.: 254.

Not open to students with credit for 416, 514, 552, or 552.02.

Not recommended for Math. majors.

Topics discussed include power series expansions, the formula of Cauchy, residues, conformal mappings, and elementary functions in the complex domain.

**552.02 Complex Variable I**

H552.02 (Honors) may be available to students enrolled in a college Honors program; others by permission of dept.

Prereq.: 550.

Not open to students with credit for 552 or 552.01.

The Cauchy integral theorem and its consequences, elementary functions and mappings, representation theorems, residue theory.

**553 U G 5****Introduction to the Theory of Functions of a Complex Variable II**

Sp. 5 cl.

Prereq.: 552.

A continuation of 552.

**556 U G 5****Differential Equations**

A, W. 5 cl.

**556.01 Differential Equations**

H556.01 (Honors) may be available to students enrolled in a college Honors program; others by permission of dept.

Prereq.: 254.

Not open to students with credit for 255, 415, or 556.02.

Equations of first order and second order, linear equations, series solutions, approximate solutions, systems of ordinary equations; Legendre and Bessel equations.

**556.02 Differential Equations**

H556.02 (Honors) may be available to students enrolled in a college Honors program; others by permission of dept.

Prereq.: 254 and 571.

Not open to students with credit for 556.01.

First order equations, first order linear systems, functions of matrices, series solutions, existence and uniqueness theorems.

**557 U G 5****Orthogonal Systems and Differential Equations**

W, Sp. 5 cl.

Prereq.: 556.01 or 556.02, or 255 and permission of instructor.

Fourier series, orthogonal systems; Sturm-Liouville problems; integral transforms, generalized functions; applications to ordinary and partial differential equations.

**560 U G 5****Topology**

Sp. 5 cl.

Prereq.: 254 or permission of chairman.

Sets and functions, metric spaces, completeness, Baire's Theorem, continuous mappings, Euclidean spaces, compactness, connectedness, topological spaces.

**570 U G 5****Elementary Modern Algebra**

W, Sp. 5 cl.

Prereq.: 571 and 573.

An introduction to abstract algebra with topics from elementary ring, field, and group theories; special emphasis on ring of integers, congruences, polynomial domains, permutation groups.

**571 U G 5****Introduction to Linear Algebra**

Su, W, Sp. 5 cl.

H571 (honors) may be available to students enrolled in a college honors program; others with permission of dept.

Prereq.: 153 or permission of chairman.

Not open to students with credit for H290 or 471.

Vector spaces, linear maps, matrices, inner product spaces, systems of equations, determinants, and spectral theory.

**573 U G 5**  
**Elementary Number Theory**

A, W. 5 cl.  
Prereq.: 153 or permission of chairman.  
Utilization of concrete examples to introduce concepts of modern algebra; prime numbers, congruences, Diophantine equations, elementary combinatorial analysis.

**574 U G 5**  
**Geometry**

Sp. 5 cl.  
Prereq.: 570 and 571.  
Euclidean and non-Euclidean geometry, emphasizing algebraic connections; Affine and projective planes, duality. Topics from: geometry of groups, finite planes, Hilbert's postulates, n-dimensional spaces, continuous geometry.

**575 U G 5**  
**Combinatorial Mathematics and Graph Theory**

Sp.  
Prereq.: 571 or permission of instructor.  
Some classical puzzles of recreational mathematics; matching theory, graph theory, network flows, and optimization; enumeration techniques; combinatorial designs and coding theory.

**577 U G 5**  
**Discrete Algebraic Structures**

A, Sp. 5 cl.  
Prereq.: 571.  
Not open to students with credit for Math. 570.  
An introduction to discrete and finite algebraic structures with applications to computer and information science.

**580 U 5**  
**Algebra I**

A. 5 cl.  
Prereq.: 254 and permission of instructor.  
Not open to students with credit for 570.  
The sequence 580, 581, 582 is an alternative to 570, 571, 573; an integrated sequence of topics from elementary number theory and algebraic structures.

**581 U 5**  
**Algebra II**

W. 5 cl.  
Prereq.: 580.  
Not open to students with credit for 570.  
Continuation of 580.

**582 U 5**  
**Algebra III**

Sp. 5 cl.  
Prereq.: 581.  
Not open to students with credit for 570.  
Continuation of 581.

**H590 U G 5**  
**Algebraic Structures I**

A.  
Prereq.: 290.  
The sequence 590, 591, substitutes for 570, 573. Integers, congruence relations, structure preserving maps, topics from groups, rings, modules, vector spaces, fields.

**H591 U G 5**  
**Algebraic Structures II**

W.  
Prereq.: 590.  
Continuation of 590.

**H592 U G 5**  
**Algebraic Structures III**

Sp. 5 cl.  
Prereq.: H591.  
Continuation of H591; further topics in group and field theory and their interrelation; Galois theory.

**593 U G 2-5**  
**Individual Studies in Mathematics**

A, W, Sp.  
Prereq.: Permission of instructor.  
Repeatable to a maximum of 20 cr. hrs.

**594 U G 2-5**  
**Group Studies in Mathematics**

Su, A, W, Sp.  
Prereq.: Permission of instructor.  
Repeatable to a maximum of 20 cr. hrs.

**601 U G 5**  
**Mathematical Methods in Science I**

A. 5 cl.  
Prereq.: 15 cr. hrs. of Math. at the 400-500 level or permission of instructor. The recommended preliminary courses are 550, 551, 552.  
Theory of determinants and matrices, real quadratic and Hermitian forms, groups and vector spaces, applications to physics and engineering.

**602 U G 5**  
**Mathematical Methods in Science II**

W. 5 cl.  
Prereq.: 601.  
Linear differential equations, solutions about singular points; Fourier series; Sturm-Liouville problems; Bessel functions and Legendre polynomials; boundary value problems associated with Laplace's equation.

**603 U G 3**  
**Stability Problems in Differential Equations**

Sp. 3 cl.  
Prereq.: 255 or 556.  
Existence and uniqueness of solutions; initial conditions; periodic solutions; Kryloff-Bogoljuboff method; graphical and numerical methods; applications to vibrational problems, relaxation theory, and nonlinear mechanics.

**608 U G 5****Advanced Geometry II**

Sp. 5 cl.

Prereq.: 507 and permission of instructor.

Continuation of 507; selected topics.

**611 U G 5****Principles of Mathematics  
for Science and Mathematics Teachers**

Su. 5 cl.

Prereq.: Permission of instructor.

(NSF students only).

Introduction to modern mathematics, sets, functions, topology.

**612 U G 5****Modern Geometry for High School Teachers**

Su. 5 cl.

(NSF students only).

Coordinate geometry use of vectors in geometry, matrices and coordinate transformations, matrix-vector operations, characteristic values, diagonalization of quadratic forms.

**613 U G 5****Modern Algebra for High School Teachers**

Su. 5 cl.

(NSF students only).

A basic modern algebra course for teachers of algebra; topics will include: groups, rings, integral domains, fields, an axiomatic approach to high school algebra.

**614 U G 5****Analysis for High School Teachers**

Su. 5 cl.

(NSF students only).

Extension of the rational number concept to the real number concept, functions, limit concept, sequences, continuous functions, derivative, integral series, applications of the calculus.

**635 U G 3****Game Theory**

Sp. 3 cl.

Prereq.: 571 or permission of instructor.

Concept of a game, minimax theorem; linear programming.

**651 U G 4****Introduction to Real Analysis I**

A. 4 cl.

H651 (honors) may be available to students enrolled in a college honors program; others with permission of dept.

Prereq.: Permission of instructor.

Real numbers, infinite sequences and series.

**652 U G 4****Introduction to Real Analysis II**

W. 4 cl.

H652 (honors) may be available to students enrolled in a college honors program; others with permission of dept.

Prereq.: 651.

Classes of functions, Riemann-Stieltjes integral.

**653 U G 4****Introduction to Real Analysis III**

Sp. 4 cl.

H653 (honors) may be available to students enrolled in a college honors program; others with permission of dept.

Prereq.: 652.

Measurable sets and functions, elementary theory of the Lebesgue integral.

**654 U G 3****Complex Variables**

A. 3 cl.

Prereq.: Permission of instructor.

Recommended primarily for graduate students in science and engineering.

Not open to students with credit for 514 or 552.

Complex arithmetic, geometry, conformal mapping, analytic functions, and residues.

**655 U G 3****Elementary Topology I**

A. 3 cl.

Prereq.: Permission of dept.

Continuity, compactness, connectedness in metric and general topological spaces; product and quotient spaces; fundamental group and covering spaces.

**656 U G 3****Elementary Topology II**

W. 3 cl.

Prereq.: 655.

Continuation of 655.

**657 U G 3****Elementary Topology III**

Sp. 3 cl.

Prereq.: 656.

Continuation of 656.

**662 U G 5****Calculus of Variations**

A. 5 cl.

Prereq.: 255 or 556; 551.

Variation of a functional; Euler-Lagrange equations; Hamilton-Jacobi theory; second variation Theory of field; Noether theorem; direct methods; applications to geometry and physics.

**670 U G 4****Algebra I**

A. 4 cl.

H670 (honors) may be available to students enrolled in a college honors program; others with permission of dept.

Prereq.: Permission of instructor.

Elementary number theory, polynomials, Euclidean domains; elementary theory of groups and fields, vector spaces and modules over a ring, linear transformations, determinants, normal form of matrices, quadratic forms.



**671 U G 4**

**Algebra II**

W. 4 cl.

H671 (honors) may be available to students enrolled in a college honors program; others with permission of dept.

Prereq.: 670.

Continuation of 670.

**672 U G 4**

**Algebra III**

Sp. 4 cl.

H672 (honors) may be available to students enrolled in a college honors program; others with permission of dept.

Prereq.: 671.

Continuation of 671.

**674 U G 5**

**Topics in Combinatorial Mathematics**

A. 5 cl.

Prereq.: 672 or permission of instructor.

Permutations, combinations, partitions, latin squares, finite geometries.

**680 U G 5**

**Projective Geometry**

Su, A. 5 cl.

Prereq.: 672.

The combinatorial and algebraic aspects of projective geometry, including non-Desarguesian and finite projective planes, coordination, the theory of collineations, incidence matrices, Latin squares.

**693 U G 1-5**

**Individual Studies**

Su, A, W, Sp.

Individual conferences, assigned readings, and reports on minor investigations.

**694 U G 2-5**

**Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Designed to give groups of students an opportunity to pursue special studies not otherwise offered.

**701 U G 5**

**Mathematical Methods in Science III**

Sp. 5 cl.

Prereq.: 571, 601, or permission of instructor.

Introduction to tensor analysis with applications to geometry; elements of the calculus of variations with applications to physical problems.

**702 U G 3**

**Integral Equations and Eigenvalue Problems I**

A. 3 cl.

Prereq.: 601 and 602.

Orthogonal functions, linear, integral equations of first and second kinds, relations to ordinary differential equations, Volterra's equation, boundary value problems, practical methods of solution.

**703 U G 3**

**Integral Equations and Eigenvalue Problems II**

W. 3 cl.

Prereq.: 702.

Distribution of eigenvalues, self-adjointness, definiteness, Green's functions, minimal properties, approximation of eigenvalues, eigenfunction expansions, Ritz method, iteration method, matrix eigenvalue problems, finite differences.

**704\* U G 3**

**Operational Calculus**

Sp. 3 cl.

Prereq.: 601 and 602.

Laplace transformation in real domain, applications in physics and engineering; differential equations; Laplace transformation in complex domain, application to partial differential equations; Fourier transform, applications.

**705 U G 3**

**Special Functions**

W. 3 cl.

Prereq.: 601 and 602.

Power series developments, asymptotic expansion, gamma functions, cylindrical functions, spherical harmonics, orthogonal polynomials, hypergeometric functions, theta functions, elliptic functions and integrals, numerical techniques.

**706 U G 5**

**Applied Complex Analysis**

Sp. 5 cl.

Prereq.: 414, or 552 and 556. Students are urged to fulfill the prereq. with 552.

Basic facts of complex analysis; conformal mapping properties of elementary functions, Schwartz—Christoffel formula; distortion theorems; uniformization; applications to electromagnetic fields, fluid dynamics, heat flow.

**710 U G 5**

**Projective Geometry I**

A. 5 cl.

Prereq.: Permission of instructor.

Desarguesian spaces; lattice-theoretic characterization; introduction of coordinates; fundamental theorem on collineations; correlations.

**711 U G 5**

**Projective Geometry II**

W. 5 cl.

Prereq.: 710 or permission of instructor.

Non-Desarguesian planes; collineations; coordinates; Lenz-Barlotti theorem; Bruck-Ryser theorem; existence and non-existence results; selection of related topics.

**722 U G 4**

**Theory of Probability I**

A. 3 cl., 1 lab. hr.

Prereq.: 653.

Fundamentals of measure theory, general probability distributions, Lebesgue integral, and conditional expectations.

**723 U G 4****Theory of Probability II**

W. 3 cl., 1 lab. hr.

Prereq.: 722.

Characteristic functions, limit theorems, Markov processes, and stationary processes.

**724 U G 4****Theory of Probability III**

Sp. 3 cl., 1 lab. hr.

Prereq.: 723.

Continuation of 723.

**730 U G 4****Mathematical Foundations of Probability Theory**

A. 3 cl., 1 lab. hr.

Prereq.: 724 or permission of instructor.

Martingales; selected topics from stochastic processes.

**737 U G 3****Mathematical Information Theory I**

W. 3 cl.

Prereq.: Either 522, 722, 830, or permission of instructor.

Probabilistic coding theory and coding theorems.

**738 U G 3****Mathematical Information Theory II**

Sp. 3 cl.

Prereq.: 670, and 522 or 722 or 830.

Algebraic coding theory; group codes.

**741 U G 3****Mathematical Foundations of the Design and Use of Automatic Systems I**

A. 3 cl.

Prereq.: Grad. standing or permission of instructor.

Boolean operations; reduction of systems of Boolean functions; turing machines and general recursive functions; application to problems relating to design and use of automatic systems.

**742 U G 3****Mathematical Foundations of the Design and Use of Automatic Systems II**

W. 3 cl.

Prereq.: 741 and grad. standing or permission of instructor.

Continuation of 741.

**743 U G 3****Mathematical Foundations of the Design and Use of Automatic Systems III**

Sp. 3 cl.

Prereq.: 742 and grad. standing or permission of instructor.

Continuation of 742.

**749† U G 5****Advanced Mathematical Logic I**

A. 5 cl.

Prereq.: 545 or 670.

A study of the axiomatic method; the classical theorems of Skolem and Godel; some modern results about modelclasses and the theory of definability; axiomatic number-theory and set-theory.

**750 U G 5****Real Analysis I**

Su. A. 5 cl.

Prereq.: 653.

Relative extremes in partial orders; additive and countable additive set functions; extensions of set functions; integration differentiation, applicators.

**751 U G 5****Real Analysis II**

W. 5 cl.

Prereq.: 750.

Continuation of 750.

**752 U G 5****Real Analysis III**

Sp. 5 cl.

Prereq.: 751.

Continuation of 751.

**753 U G 5****Introduction to Complex Analysis I**

A. 5 cl.

Prereq.: 653.

Families of holomorphic and meromorphic functions, geometrical methods of the theory of functions, conformal transformations; including the Cauchy integral theorem, Runge's theorem, Riemann mapping theorem.

**754 U G 5****Introduction to Complex Analysis II**

W. 5 cl.

Prereq.: 753.

Analytic continuation, general analytic functions, algebraic, entire, elliptic, the gamma and zeta function, Dirichlet's series, Picard's theorems, Mittag-Leffler's theorem, Stirling's formula.

**755 U G 5****Introduction to Point Set Topology I**

A. 5 cl.

Prereq.: 653.

Topographical spaces, convergence; metric, complete, compact, connected, uniform, and function spaces.

**756 U G 5****Introduction to Point Set Topology II**

W. 5 cl.

Prereq.: 755.

Continuation of 755.

**758 U G 5****Graduate General Analysis I**

A. 5 cl.

Prereq.: Grad. standing or permission of instructor.

Integrated examination, from an advanced standpoint, of fundamentals of pure and applied analysis; topics may include: several variable calculus, complex variables, measure and integration theory.

**759 U G 5****Graduate General Analysis II**

W. 5 cl.

Prereq.: 758.

Continuation of 758.

**760\*** U G 3

**Ordinary Differential Equations I**

A. 3 cl.

Prereq.: 571 and 653.

Introduction to theory of linear and non-linear ordinary differential equations; equations with singular points; stability theory, boundary value problems.

**761\*** U G 3

**Ordinary Differential Equations II**

W. 3 cl.

Prereq.: 760.

Continuation of 760.

**762\*** U G 3

**Ordinary Differential Equations III**

Sp. 3 cl.

Prereq.: 761.

Continuation of 761.

**763†\*** U G 3

**Partial Differential Equations and Their Applications I**

A. 3 cl.

Prereq.: 653.

First order partial differential equations, theory of characteristics; second order partial differential equations; elliptic, parabolic, hyperbolic equations; standard method of solution, Green's function; integral equations.

**764†\*** U G 3

**Partial Differential Equations and Their Applications II**

W. 3 cl.

Prereq.: 763.

Continuation of 763.

**767** U G 5

**Introduction to the Theory of Approximation I**

A. 5 cl.

Prereq.: 653.

Approximation by polynomials and trigonometric polynomials, Chebeshev's theory of best approximation and its generalizations; interpolation processes and mechanical quadrature; orthogonal polynomials and elements of harmonic analysis.

**768** U G 5

**Introduction to the Theory of Approximation II**

W. 5 cl.

Prereq.: 550 and 767.

A continuation of 767.

**770** U G 5

**Higher Algebra I**

Su, A. 5 cl.

Prereq.: 672.

Fields, extensions, normal extension, algebraic closure, Galois group of a polynomial, theory of equations, topics in ideal and valuation theory, rings with minimum conditions crossed products.

**771†** U G 5

**Higher Algebra II**

W. 5 cl.

Prereq.: 770.

A continuation of 770.

**772†** U G 5

**Higher Algebra III**

Sp. 5 cl.

Prereq.: 771.

A continuation of 771.

**775** U G 5

**Combinatorial Analysis and Graph Theory I**

A.

Prereq.: 672.

Ramsey's theorem, systems of distinct representatives, zero-one matrices, orthogonal Latin squares, combinatorial designs, and difference sets.

**776** U G 5

**Combinatorial Analysis and Graph Theory II**

W.

Prereq.: 775.

Mobius inversion principle, Polya theory of counting, planar graphs, connectivity, coloring min cut max flow, integer programming and combinatorial extrema, graphs and adjacency matrices.

**777** U G 5

**Combinatorial Analysis and Graph Theory III**

Sp.

Prereq.: 776.

Totally unimodular matrices, matroids, combinatorial problems of coding theory, probabilistic fluctuation theory, and other selected topics.

**779** U G 2-5

**Experimental Number Theory**

A, W, Sp. 3 cl., 2 labs.

Prereq.: Permission of instructor.

Topics from elementary and/or algebraic number theory; number theoretical explorations utilizing high-speed digital computers.

**780** U G 5

**Number Theory I**

A. 3 lec., 2 seminars.

Prereq.: 672.

Diophantine equations, Congruences, p-adic numbers, algebraic number theory, class numbers, distribution of primes, continued fractions.

**781** U G 5

**Number Theory II**

W. 3 lec., 2 seminars.

Prereq.: 780.

Continuation of 780.

**782** U G 5

**Number Theory III**

Sp. 3 lec., 2 seminars.

Prereq.: 781.

Continuation of 781.

**794 U G 2-5****Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

When students' need is sufficient, the Department will offer under this number a course on some phase of mathematics not covered in its regular offerings.

**830 G 3-5****Advanced Probability I**

A. 3 cl., 1 lab. hr.

Prereq.: 751 and permission of instructor.

Selected topics from foundations, martingales stochastic processes.

**831 G 3-5****Advanced Probability II**

W. 3 cl., 1 lab. hr.

Prereq.: 830.

Continuation of 830.

**832 G 3-5****Advanced Probability III**

Sp. 3 cl., 1 lab. hr.

Prereq.: 831.

Continuation of 831.

**844 G 5****Advanced Mathematical Logic II**

W. 5 cl.

Prereq.: 749.

Continuation of 749.

**846 G 2-5****Topics in Discrete Mathematics**

W. 2-5 cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

**847† G 5****Transfinite Arithmetic I**

A.

Prereq.: 750 and 770.

Axiomatic Set Theory; ordinal numbers and Transfinite functions; polynomial representation; normal forms; number classes; inequalities for cardinal numbers; consequences of the continuum hypothesis; inaccessible numbers.

**848† G 5****Transfinite Arithmetic II**

W.

Prereq.: 847.

Continuation of 847.

**851 G 3****Differential Geometry I**

A. 3 cl.

Prereq.: 751, 756, and 771.

Curves, surfaces, fundamental forms, tensors, and connections.

**852 G 3****Differential Geometry II**

W. 3 cl.

Prereq.: 851.

Continuation of 851.

**854 G 5****Differentiable Manifolds and Lie Groups I**

W. 5 cl.

Prereq.: 751, 756, and 771.

Tensors, exterior differential forms, connections; Lie Groups.

**855 G 5****Differentiable Manifolds and Lie Groups II**

Sp. 5 cl.

Prereq.: 854.

Continuation of 854.

**857 G 3****Introduction to Functional Analysis I**

A. 3 cl.

Prereq.: 552 and 751.

Linear topological spaces, normed spaces, Hilbert spaces, convex sets, integration of vector-valued functions.

**858 G 3****Introduction to Functional Analysis II**

W. 3 cl.

Prereq.: 857.

Continuation of 857.

**859 G 3****Introduction to Functional Analysis III**

Sp. 3 cl.

Prereq.: 857 and 858.

Banach Algebras, spectral theory, harmonic analysis, fixed-point theorems; applications to analysis.

**860 G 3****Algebraic Topology I**

A. 3 cl.

Prereq.: 751, 756, and 771.

Metric space topology, complexes in Euclidean spaces, singular homology theory.

**861 G 3****Algebraic Topology II**

W. 3 cl.

Prereq.: 860.

Continuation of 860.

**862 G 3****Algebraic Topology III**

Sp. 3 cl.

Prereq.: 861.

Continuation of 860 and 861.

**863\* G 3****Potential Theory I**

A.

Prereq.: 552 and permission of instructor.

Newtonian Potentials, Boundary Value Problems; Logarithmic Potential, Elliptic Partial Differential Equations.

864\* G 3

**Potential Theory II**

W.

Prereq.: 863.

Continuation of 863.

865 G 2-5

**Topics in Mathematical Physics**

Su, A. 2-5 cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

866 G 2-5

**Mathematical Problems in Engineering**

Sp. 2-5 cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

867 G 5

**Dimension Theory**

Sp. 5 cl.

Prereq.: 751, 756, and 771.

Dimension in separable metric spaces with application of Euclidean spaces; covering theorems, imbedding theorems, and approximation theorems; relationships between the concept of dimension and measure.

869 G 2-5

**Mathematical Theory of Communication and Control**

Sp. 2-5 cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

870 G 2-5

**Topics in Graph Theory**

A, W, Sp.

Prereq.: 777 and permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Topics of current research interest.

873 G 5

**Group Theory I**

A. 5 cl.

Prereq.: 771.

Properties of groups, extensions, transfer, generators and defining relations.

874 G 5

**Group Theory II**

W. 5 cl.

Prereq.: 873.

Continuation of 873.

876 G 5

**Analytic Number Theory**

A, W. 5 cl.

Prereq.: Permission of instructor.

The distribution of prime numbers; Waring's problems, and selected topics.

877 G 5

**Theory of Algebraic Numbers**

A, W, Sp. 5 cl.

Prereq.: Permission of instructor.

Ideals in algebraic number fields, unique decomposition theorem, different, discriminant, ideal classes, applications of Galois theory and analytical methods.

931 G 3

**Ergodic Theory I**

A. 3 cl.

Prereq.: 751.

Measurable transformations, mixing and ergodicity, existence of invariant measures, contraction operations on function spaces, ergodic theorems.

932 G 3

**Ergodic Theory II**

W. 3 cl.

Prereq.: 931.

Continuation of 931.

933 G 3

**Sums of Independent Random Variables I**

A. 3 cl.

Prereq.: 830 or 722 and 751.

Limit theorems for sums of independent random variables, infinitely divisible distributions, stable laws.

934 G 3

**Sums of Independent Random Variables II**

W. 3 cl.

Prereq.: 933.

Continuation of 933.

935 G 3

**Random Walks and Brownian Motion I**

W. 3 cl.

Prereq.: 830 or 722 and 751.

Recurrence, periodicity, hitting probabilities, potential theory, recurrent and transient random walks, Brownian motion.

936 G 3

**Random Walks and Brownian Motion II**

Sp. 3 cl.

Prereq.: 935.

Continuation of 935.

937 G 3

**Semi Groups and Markov Processes I**

W. 3 cl.

Prereq.: 751.

Sample functions and semi groups generated by Markov processes; general potential theory including Green's Function and generalized capacity.

938 G 3

**Semi Groups and Markov Processes II**

Sp. 3 cl.

Prereq.: 937.

Continuation of 937.

**939 G 2-5****Topics in Probability Theory**

Su, A, W, Sp.  
 Prereq.: Permission of instructor.  
 Repeatable to a maximum of 20 cr. hrs.  
 Various advanced topics in probability theory.

**949 G 2-5****Seminar in Logic**

Su, A, W, Sp.  
 Prereq.: Permission of instructor.  
 Repeatable to a maximum of 20 cr. hrs.

**950 G 2-5****Topics in Real Analysis**

Su, A, W, Sp.  
 Prereq.: Permission of instructor.  
 Repeatable to a maximum of 20 cr. hrs.

**951 G 2-5****Topics in Complex Analysis**

Su, A, W, Sp. 2-5 cl.  
 Prereq.: 754.  
 Repeatable to a maximum of 20 cr. hrs.

**953 G 2-5****Topics in Topology**

A, W, Sp.  
 Prereq.: Permission of instructor.  
 Repeatable to a maximum of 20 cr. hrs.

**954 G 2-5****Topics in Algebraic Topology**

Su, A, W, Sp.  
 Prereq.: Permission of instructor.  
 Repeatable to a maximum of 20 cr. hrs.

**957 G 2-5****Topics in Differential Geometry**

Su, A, W, Sp.  
 Prereq.: Permission of instructor.  
 Repeatable to a maximum of 20 cr. hrs.

**959 G 4****Measure and Integration I**

A. 4 cl.  
 Prereq.: 751.  
 Topics will be chosen from current research papers.

**960 G 4****Measure and Integration II**

W. 4 cl.  
 Prereq.: 959.  
 Continuation of 959.

**961 G 2-5****Topics in Functional Analysis**

Su, A, W, Sp. 2-5 cl.  
 Prereq.: Permission of instructor.  
 Repeatable to a maximum of 20 cr. hrs.  
 Topics to be chosen from current research papers.

**970 G 5****Representation Theory I**

A. 5 cl.  
 Prereq.: Permission of instructor.  
 Topics to be chosen from current research papers.

**971 G 5****Representation Theory II**

W. 5 cl.  
 Prereq.: 970.  
 Continuation of 970.

**972 G 2-5****Combinatorial Analysis**

Sp. 2-5 cl.  
 Prereq.: 771  
 Repeatable to a maximum of 20 cr. hrs.  
 Topics selected from current research papers.

**973 G 5****Homological Algebra I**

A. 5 cl.  
 Prereq.: 772.  
 Introduction into the basic concepts of homological algebra.

**974 G 5****Homological Algebra II**

W. 5 cl.  
 Prereq.: 973 or permission of instructor.  
 Continuation of 973.

**975 G 2-5****Topics in Geometry**

Su, A, W, Sp. 2-5 cl.  
 Prereq.: Permission of instructor.  
 Repeatable to a maximum of 20 cr. hrs.  
 Topics to be chosen from current research papers.

**978 G 2-5****Theory of Rings**

Su, A, W, Sp. 2-5 cl.  
 Prereq.: 772.  
 Repeatable to a maximum of 20 cr. hrs.  
 Topics selected from current research papers.

**979 G 2-5****Theory of Matrices**

Su, A, W, Sp. 2-5 cl.  
 Prereq.: 771.  
 Repeatable to a maximum of 20 cr. hrs.  
 Topics selected from current research papers.

**980 G 2-5****Lattice Theory**

Su, A, W, Sp. 2-5 cl.  
 Prereq.: 771.  
 Repeatable to a maximum of 20 cr. hrs.  
 Topics selected from current research papers.

**981**                    **G 2-5**  
**Topics in the Theory of Groups**  
 Su, A, W, Sp.  
 Prereq.: Permission of instructor.  
 Repeatable to a maximum of 20 cr. hrs.

**982**                    **G 2-5**  
**Topics in Algebra**  
 Su, A, W, Sp. 2-5 cl.  
 Prereq.: Permission of instructor.  
 Repeatable to a maximum of 20 cr. hrs.  
 Topics selected from current research papers.

**983**                    **G 2-5**  
**Topics in Number Theory**  
 Su, A, W, Sp.  
 Prereq.: Permission of instructor.  
 Repeatable to a maximum of 20 cr. hrs.

**984**                    **G 2-5**  
**Topics in Algebraic Geometry**  
 Su, A, W, Sp. 2-5 cl.  
 Prereq.: Permission of instructor.  
 Repeatable to a maximum of 20 cr. hrs.  
 Topics to be chosen from current research papers.

**985**                    **G 2-5**  
**Seminar in Group Theory**  
 Su, A, W, Sp.  
 Prereq.: Permission of instructor.  
 Repeatable to a maximum of 20 cr. hrs.

**986**                    **G 2-5**  
**Seminar on Algebra**  
 Su, A, W, Sp.  
 Prereq.: Permission of instructor.  
 Repeatable to a maximum of 20 cr. hrs.

**987**                    **G 2-5**  
**Seminar on Commutative Algebra**  
 Su, A, W, Sp.  
 Prereq.: Permission of instructor.  
 Repeatable to a maximum of 20 cr. hrs.

**988**                    **G 2-5**  
**Seminar on Number Theory**  
 Su, A, W, Sp.  
 Prereq.: Permission of instructor.  
 Repeatable to a maximum of 20 cr. hrs.

**989**                    **G 2-5**  
**Seminar on Geometry of Numbers**  
 Su, A, W, Sp.  
 Prereq.: Permission of instructor.  
 Repeatable to a maximum of 20 cr. hrs.

**990**                    **G 2-5**  
**Seminar on Geometry**  
 Su, A, W, Sp.  
 Prereq.: Permission of instructor.  
 Repeatable to a maximum of 20 cr. hrs.

**995**                    **G 2-5**  
**Seminar in Ergodic Theory**  
 Su, A, W, Sp.  
 Prereq.: Permission of instructor.  
 Repeatable to a maximum of 20 cr. hrs.  
 Topics selected from current research papers.

**996**                    **G 2-5**  
**Seminar in Analysis**  
 Su, A, W, Sp.  
 Prereq.: Permission of instructor.  
 Repeatable to a maximum of 20 cr. hrs.

**997**                    **G 2-5**  
**Seminar in Topology**  
 Su, A, W, Sp.  
 Prereq.: Permission of instructor.  
 Repeatable to a maximum of 20 cr. hrs.

**998**                    **G 2-5**  
**Seminar in Applied Mathematics**  
 Su, A, W, Sp.  
 Prereq.: Permission of instructor.  
 Repeatable to a maximum of 20 cr. hrs.

**999**                    **G Arr.**  
**Research**  
 Su, A, W, Sp.  
 Research for thesis or dissertation purposes only.

## Mathematics and Physical Sciences

**180**                    **U 5**  
**The Uses of Science  
in Solving Problems of Society**  
 A, Sp. 5 cl.  
 Prereq.: Placement in Level 4 or higher in the OSU  
 Math. Placement Test.  
 Using examples, it is shown how the methods of  
 science can be used to analyze problems which are of  
 interest to the general public.

## Mechanical Engineering

Office: 2075 Robinson Laboratory, 206 West 18th Avenue

**Professors** Glower (Chairman), Beitler (Emeritus), Bolz, Doebelin, Han, Jones, Marco, Moffat (Emeritus), Redmond, Sepsy, Smith, Starkey, Stinson (Emeritus), Velkoff, and Zimmerman; **Associate Professors** Buxton, Engelman, Foster, and Moran; **Adjunct Associate Professor** Epstein; **Assistant Professors** Bridge, Davidson, Faulkner, Houser, Jordan, Korpela, Kulacki, Miller, Nakamura, and Schlosser.

### 281 U 4

#### System Dynamics

A, Sp. 3 cl., 1 2-hr. lab.

Prereq.: Engr. Mech. 410 and Math. 255, or equiv.

Theoretical and experimental study of the dynamics of linear, lumped-parameter models of mechanical, electrical, fluid, thermal, and mixed systems. Doebelin.

### 308 U 3

#### Thermodynamics

Sp. 3 cl.

Prereq.: Math. 254 and Physics 133.

Not open to students majoring in Mech. E.

Not open to students with credit for 301.

A study of engineering thermodynamics. Bridge.

### 309 U 3

#### Thermodynamics

A, W, Sp. 3 cl.

Prereq.: Math. 415 and Physics 133.

Not open to students majoring in Mech. E.

Not open to students with credit for 500.

Study of macroscopic and microscopic thermodynamics. Bridge.

### 311 U 3

#### Heat Transfer and Fluid Flow

A, W, Sp. 3 cl.

Prereq.: 309.

Not open to students majoring in Mech. E.

Not open to students with credit for 511.

Study of the fundamental principles of heat transfer and fluid flow with applications to electrical machinery and apparatus. Jones.

### 350 U 5

#### Machine Design

Sp. 5 cl.

Prereq.: Engr. Mech. 420.

Not open to students majoring in Mech. E.

Not open to students with credit for 550.

A study of the application of the general principles and empiricisms of mechanics of solids to the creative design of mechanical equipment. Starkey.

### 382 U 4

#### Mechanical Engineering Analysis

A, W. 3 cl., 1 2-hr. lab.

Prereq.: 281.

Continuation of 281 with additional analytical techniques of general usefulness in mechanical engineering. Doebelin.

### 501 U G 4

#### Thermodynamics I

A, W. 4 cl.

Prereq.: Chem. 205 and Math. 254.

A study of basic engineering thermodynamics. Moran.

### 502 U G 4

#### Thermodynamics II

W, Sp. 4 cl.

Prereq.: 501, or permission of instructor.

Continuation of 501. Moran.

### 503 U G 4

#### Fluid Dynamics I

W, Sp. 4 cl.

Prereq.: 501.

A study of the basic concepts, fundamental equations, and applications of fluid mechanics to engineering problems. Han.

### 504 U G 4

#### Fluid Dynamics II

A, Sp. 4 cl.

Prereq.: 502 and 503.

Continuation of 503. Han.

### 510 U G 4

#### Heat Transfer

A, Sp. 4 cl.

Prereq.: 503.

Not open to students with credit for (611).

A study of the fundamental laws of heat conduction, radiation, and convection, including an introduction to transient conduction. Jones.

### 526 U G 3

#### Energy Release and Conversion Processes

A, W. 3 cl.

Prereq.: 504; concur. 510.

Not open to students with credit for 520.

Energy release in combustion, nuclear, electrical, and direct conversion devices. Jones.

### 527 U G 3

#### Energy Conversion in Turbomachinery

A, W. 3 cl.

Prereq.: 526.

Not open to students with credit for 624.

Energy conversion in power-producing, -absorbing, and -transmitting turbomachinery. Jones.

### 528 U G 3

#### Energy Conversion in Positive Displacement Machinery

W, Sp. 3 cl.

Prereq.: 527.

Not open to students with credit for 621.

Energy conversion in power-producing, -absorbing, and -transmitting positive displacement machinery. Jones.

### 553 U G 5

#### Kinematics and Dynamics of Machinery

A, W. 5 cl.

Prereq. or concur.: 281.

Not open to students with credit for 551-552.



Motion and force analysis in mechanisms such as plane linkages, cams, and gears; introduction to the synthesis of plane linkages and simple cam systems. Davidson.

**561 U G 4**

**Principles of Mechanical Design**

W, Sp. 4 cl.

Prereq.: 553, Engr. Mech. 420, and Indust. E. 301; prereq. or concur. Met. E. 301.

Not open to students with credit for 661.

A study of the application of the general principles and empiricisms of mechanics of solids to the creative design of mechanical equipment. Starkey.

**562 U G 4**

**Principles of Mechanical Design**

A, Sp. 4 cl.

Prereq.: 561 or 661.

Not open to students with credit for 662.

Continuation of 561. Starkey.

**563 U G 4**

**Principles of Mechanical Design**

A, W. 4 cl.

Prereq.: 561 or 661.

Not open to students with credit for 663.

Continuation of 561. Starkey.

**564 U G 3**

**Mechanical Engineering Design I**

W, Sp. 3 2-hr. lab.

Prereq.: 561 and 562.

Not open to students with credit for 761.

The methodology of intermediate design and practice in the design of a specific system which may utilize principles of any or all mechanical engineering disciplines. Foster.

**570 U G 3**

**Mechanical Engineering Measurements**

A, W. 1 cl., 1 4-hr. lab.

Prereq. or concur.: 510, and 552 or 553.

Not open to students with credit for 670.

A theoretical and experimental study of the principles of operation and performance characteristics of measuring instruments used in mechanical engineering. Doebelin.

**571 U G 4**

**Principles of Automatic Control**

W, Sp. 3 cl., 1 2-hr. lab.

Prereq.: 510, 552 or 553, and 570 or 670; or permission of instructor.

Not open to students with credit for 771.

A theoretical and experimental study of the principles of operation of feedback control systems, including servomechanisms and process control. Doebelin.

**581 U G 3**

**Mechanical Engineering Laboratory**

W, Sp. 2 2-hr. lab. and 5 hrs. lab. planning and report writing.

Prereq.: 570 or 670.

Not open to students with credit for 781.

The study and application of methods of experimental analysis. Buxton.

**588 U 1**

**Professional Aspects of Mechanical Engineering**

A. 1 cl.

Prereq.: 3rd yr. standing in Mech. E.

A study of the code of ethics, licensing law, responsibilities to professional societies, and the relationships to labor and management of the professional engineer. Glower.

**593 U G 1-5**

**Individual Studies in Mechanical Engineering**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 12 cr. hrs.

Provides the opportunity to pursue special studies in mechanical engineering not otherwise covered.

**594 U G 1-5**

**Group Studies in Mechanical Engineering**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 12 cr. hrs.

Special topics in Mechanical Engineering; the particular topic, credit hours, and the instructor will be announced in the quarter previous to the one in which the course will be offered.

**612 U G 3**

**Principles of Heat Exchangers**

A. 3 cl.

Prereq.: 510.

A study of principles of heat and mass transfer as applied to the design of heat exchangers. Jones.

**613 U G 3**

**Cryogenic Systems**

Sp. 3 cl.

Prereq.: 311, 503, and 510.

Study of low-temperature processes and equipment; physical properties at low temperatures; practical application of low-temperature techniques and processes in engineering systems. Jones.

**625 U G 3**

**Vapor Power Cycles**

A. 3 cl.

Prereq. or concur.: 510 and 526.

A descriptive and analytical study of elementary and advanced power plant cycles. Buxton.

**630 U G 3**

**Internal Combustion Engines**

A. 3 cl.

Prereq. or concur.: 526 or permission of instructor.

Not open to students with credit for 720.

A study of combustion chambers, valve mechanisms, and the dynamic balance of internal combustion engines. Engelman.

**631 U G 3**

**Internal Combustion Engines**

W. 3 cl.

Prereq. or concur.: 526 or permission of instructor.

Not open to students with credit for 721.

Force analysis as related to the design of engine components such as pistons, bearings, valve springs, and crankshafts. Engelman.

**632 U G 3****Diesel Engines**

Sp. 3 cl.

Prereq. or concur.: 526 or permission of instructor.

Not open to students with credit for 722.

An advanced study of Diesel engine operation, and economics. Engelman.

**634 U G 3****Gas Turbine Power Plants**

W. 3 cl.

Prereq. or concur.: 526 and 527; or permission of instructor.

Not open to students with credit for 724.

A study of the principles, performance, and design of gas turbine power plants. Engelman.

**636 U G 3****Nuclear Power Plants**

Sp. 3 cl.

Prereq.: 510 or permission of instructor.

Not open to students with credit for 726.

A study of the thermal and mechanical design aspects of nuclear power plants and processes. Glower.

**640 U G 3****Principles of Environmental Control**

A, Sp. 3 cl.

Prereq.: 502.

A study of the principles of the control of environments for human occupation, occupation by other living beings, the operations of mechanical and electrical equipment, and for the storage and processing of materials. Sepsy.

**641 U G 4****Heating, Ventilating, and Air Conditioning**

A. 4 cl.

Prereq.: 510.

Not open to students with credit for 741.

A study of practices, components, and systems for conventional and unique air conditioning equipment used to control the environment for human occupancy, storage, and industrial processes. Sepsy.

**642 U G 3****Refrigeration and Air Conditioning**

W. 3 cl.

Prereq.: 502.

Not open to students with credit for 742.

A study of fundamentals, processes, and equipment associated with refrigeration systems using vapor compression, air cycle, absorption, magnetic, and thermo-electric cooling. Sepsy.

**650 U G 4****Machinery Dynamics**

A. 3 cl., 1 2-hr. lab.

Prereq.: 553 and Math. 255; or permission of instructor.

A study of the interrelationships among forces, motions, and masses as related to rigid or elastic machine members, including force analysis, vibration, impact, and balancing. Faulkner.

**664 U G 3****Mechanical Engineering Design II**

Sp. 3 2-hr. lab.

Prereq.: 564.

Not open to students with credit for 762.

The methodology and practice in the preliminary design of an optimum system to fulfill a specified need utilizing principles of several mechanical engineering disciplines. Foster.

**665 U G 3****Lubrication and Bearing Design**

A. 3 cl.

Prereq.: 504 or permission of instructor.

Analysis and design of hydrodynamic and hydrostatic bearings using liquid or gas lubricants. Foster.

**666 U G 3****Acoustic Problems in Engineering**

W. 3 cl.

Prereq.: 503 or 504, 552 or 553, and 562; or permission of instructor.

Preparation for design problems involving noise sources in mechanical systems. Marco.

**671 U G 4****Measurement System Application and Design**

W. 3 cl., 1 2-hr. lab.

Prereq.: 570 or equiv.

Not open to students with credit for 770.

A theoretical and experimental study of measurement instrumentation; emphasis on both principles of operation and analysis and design techniques for measurement systems of a mechanical and electromechanical nature. Doebelin.

**672 U G 4****Control Systems Design**

Sp. 3 cl., 1 2-hr. lab.

Prereq.: 571 or permission of instructor.

Not open to students with credit for 772.

A study of the theoretical and experimental procedures involved in the design of feedback control systems including servomechanisms and process control. Doebelin.

**682 U G 3****Mechanical Engineering Laboratory**

Sp. 2 2-hr. lab. and 5 hrs. lab. planning and report writing.

Prereq.: 581.

Not open to students with credit for 782.

Continuation of 581. Buxton.

**687 U G 3****Introduction to Design in Biomedical Engineering**

W. 3 cl.

Prereq.: Permission of instructor.

Introduction of engineering students to design problems in biomedical engineering; analysis in biomechanics, bio-fluid mechanics, diffusion, and elementary physiology. Bridge.

**693 U G 2-10****Individual Studies in Mechanical Engineering**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 24 cr. hrs. with a maximum of 10 cr. hrs. in any one topic.

This course is intended to give the advanced student opportunity to pursue special studies not otherwise offered; work undertaken will be selected from automotive and internal combustion machinery, combustion and fuels, heat transfer, heating, ventilating, air conditioning, industrial hydraulics, machine design, refrigeration, steam power plants, and thermodynamics.

**700 U G 3****Transport Processes**

Su, A. 3 cl.

Prereq.: 510 and Math. 255; or equiv.

A parallel, systematic study of the three transport processes of mass, momentum, and energy from the continuum viewpoint. Moran.

**751 U G 3****Kinematic Synthesis and Analysis**

A. 3 cl.

Prereq.: 551 or 553, and 350 or 561.

Not open to students with credit for 851.

A study of fundamental methods for the synthesis and analysis of motions in mechanical systems. Davidson.

**766 U G 3****Engineering Acoustics**

Sp. 3 cl.

Prereq.: 666 or permission of instructor.

A course in engineering acoustics covering the phenomenon by which acoustic energy is generated and transmitted, with applications to mechanical machinery. Faulkner.

**794 U G 3-5****Group Studies in Mechanical Engineering**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 12 cr. hrs.

Advanced topics in the various phases of mechanical engineering; the particular topics, the number of credit hours, and the instructor will be announced in the quarter previous to the one in which the course is offered.

**801 G 3****Gas Dynamics**

Sp. 3 cl.

Prereq.: 504 and Math. 255, or equiv.

An analytical study of one and two dimensional steady flow and one dimensional unsteady flow. Jones.

**802 G 3****Fundamentals of Thermodynamics I**

W. 3 cl.

Prereq.: 502 and Math. 255, or equiv.

A study of thermodynamics fundamentals from the classical viewpoint. Moran.

**803\* G 3****Fundamentals of Thermodynamics II**

Sp. 3 cl.

Prereq.: 802 and Statist. 421, or equiv.

Introduction to the fundamentals of thermodynamics from the microscopic viewpoint. Moran.

**804†\* G 3****Advanced Applied Thermodynamics**

Sp. 3 cl.

Prereq.: 700 and 802.

A study of thermodynamics as applied to property interrelationships and to irreversible phenomena. Moran.

**807 G 3****Advanced Heat Transfer**

W. 3 cl.

Prereq.: 510; and 881 or Math. 512 or 557.

A study of the general heat transfer equations and their applications to heat transfer in solids and through fluids the use of numerical and graphical analysis will be included. Han.

**809†\* G 3****Advanced Heat Transfer**

A. 3 cl.

Prereq.: Math. 255 or equiv.

A study of phase change and radiative heat transfer processes. Han.

**810 G 3****Dynamics in Inviscid Fluids**

A. 3 cl.

Prereq.: 503, prereq. or concur. 881 or Math. 512, or equiv.

Three-dimensional, compressible, and incompressible inviscid flows, including irrotational and rotational motion with and without flow discontinuities. Han.

**811 G 5****Laminar Flow and Heat Transfer**

W. 5 cl.

Prereq.: 510 and 810.

Laminar boundary layers and fluid flow with and without heat transfer, fully established entrance flows, free convection, and extensions to compressible flows. Han.

**812 G 5****Turbulent Flow and Heat Transfer**

Sp. 5 cl.

Prereq.: 811.

Turbulent boundary layers and flows with and without heat transfer for internal and external flows including laminar instability, Reynolds stresses, and mixing length theory. Bridge.

**820\* G 3****Internal Combustion Power Plants**

W. 3 cl.

Prereq.: 528 or equiv.

An advanced study of reciprocating internal combustion power plants. Engelman.

**821†\* G 3****Advanced Principles of Energy Conversion in Turbomachinery**

Sp. 3 cl.

Prereq.: 527 or equiv.

An advanced study of power-absorbing, generating, and transmitting turbomachinery. Jones.

**822 G 1-18****Preliminary Design of Power Systems**

A, W, Sp. Conf.

Prereq.: Permission of instructor.

Repeatable to a maximum of 18 cr. hrs.

Preliminary design and evaluation of novel systems including analysis, synthesis, and possible experimental verification. Jones.

**823\* G 3****Advanced Steam Power Cycle and Turbine Analysis**

W. 3 cl.

Prereq.: 503, 510, and 527.

An advanced study of steam power cycles and design of steam turbine nozzles and blading. Buxton.

**824†\* G 3****Advanced Combined Vapor Power Cycle Analysis**

Sp. 3 cl.

Prereq.: 823 or permission of instructor.

A study of conventional and novel binary vapor cycles and combined vapor-gas power cycles. Buxton.

**825 G 1-18****Advanced Vapor Power Cycle and Component Studies**

A, W, Sp. Conf.

Prereq.: 823 or 824, or permission of instructor.

Repeatable to a maximum of 18 cr. hrs.

Courses to be conducted on a conference basis with problems assigned to each student based on his needs and area of interest. Buxton.

**826 G 3****Combustion**

Sp. 3 cl.

Prereq.: 700 or permission of instructor.

A study of chemical thermodynamics and kinetics, the basic equations of change, and application of fundamentals to combustion in engineering systems. McDonald. Jones.

**830\* G 3****Introduction of Electro and Magneto Fluid Mechanics**

W. 3 cl.

Prereq.: 510 and Math. 513, or permission of instructor.

A study of the interactions of electric and magnetic fields with liquids and gases. Velkoff.

**840\* G 3****Advanced Environmental Control Refrigeration**

W. 3 cl.

Prereq.: 641 or equiv.

Advanced study of conventional and novel processes including thermoelectric, magnetic, and gas systems. Sepsy.

**841†\* G 3****Advanced Environmental Control**

Sp. 3 cl.

Prereq.: 640 or equiv.

An advanced study of conventional and unique systems used to control the environment for occupancy by people, equipment, and material. Sepsy.

**842 G 1-18****Advanced Environmental Control Problems**

A, W, Sp. Conf.

Prereq.: Permission of instructor.

Repeatable to a maximum of 18 cr. hrs.

A study of methods of synthesis and analysis pertaining to the creative design of environmental control systems, involving conferences and theoretical and/or experimental investigations. Sepsy.

**850 G 3****Dynamics of High Speed Machinery**

W. 3 cl.

Prereq.: 650 and 880; or equiv.

An advanced study of the interrelationships among forces, motions, and masses as related to rigid or elastic machine members. Faulkner.

**860 G 3****Advanced Mechanical Design**

A. 3 cl.

Prereq.: 561 and Math. 255, or equiv.

A study of concepts, principles, and phenomenological theories related to the failure-prevention aspect of mechanical design. Starkey.

**861 G 3****Stress Analysis of Machinery**

Sp. 3 cl.

Prereq.: 350, 562, and 563; 881 or Math. 512, or equiv.

A study of concepts, principles, and procedures related to the analysis of stresses and strains in machine parts. Starkey.

**870 G 4****Modeling of Dynamic Systems**

Sp. 3 cl., 1 2-hr. lab.

Prereq.: 880 or permission of instructor.

A study of theoretical, experimental, and computer methods for characterizing the dynamic behavior of complex systems. Doebelin.

**880 G 3****Lumped Parameter System Analysis**

A. 3 cl.

Prereq.: Math. 255 or equiv. or permission of instructor.

Lumped parameter system analysis of mechanical, thermal, hydraulic, pneumatic, and electromechanical systems; system response to periodic, transient, and random excitation; computer and physical system demonstrations. Doebelin.

**881 G 3**  
**Distributed Parameter Systems**

A. 3 cl.  
 Prereq.: 510 and Math. 255, or equiv.  
 Not open to students with credit for 807.  
 Numerical and analytical methods for obtaining solutions to engineering problems in heat transfer, fluids mechanics, and other field problems. Bridge.

**888 G 1**  
**Mechanical Engineering Seminar**

A, W, Sp. 1 cl.  
 Prereq.: Mech. E. grad. standing.  
 Repeatable to a maximum of 3 cr. hrs. for M.S. degree and 3 additional cr. hrs. for Ph.D. degree.  
 Lecture and discussion of current topics related to mechanical engineering presented by graduate students, staff, and guest speakers. Glower.

**993 G 1-5**  
**Advanced Problems in Mechanical Engineering**

Su, A, W, Sp.  
 Prereq.: Permission of instructor.  
 Repeatable to a maximum of 12 cr. hrs.  
 Provides the opportunity to pursue special problems in mechanical engineering not otherwise covered.

**994 G 1-5**  
**Group Studies in Mechanical Engineering**

Su, A, W, Sp.  
 Prereq.: Permission of instructor.  
 Repeatable to a maximum of 12 cr. hrs.  
 Advanced topics in mechanical engineering; the topic, credit hours, and the instructor will be announced in the quarter previous to the one in which the course will be offered.

**999 G Arr.**  
**Research in Mechanical Engineering**

Su, A, W, Sp.  
 Research for thesis or dissertation purposes only.

## Medical Communications

(School of Allied Medical Professions)

Office: 243 School of Allied Medical Professions Building, 1583 Perry Street

Assistant Professors Burke (Division Director) and Schweikart; Instructors Hawes and Potts.

**550 U 8**  
**Medical Communications Media I**

W. 5 1-hr. cl., 3 2-hr. clinical experience.  
 Prereq.: Senior standing in Med. Commu. and permission of instructor.  
 Study and application of educational uses of communication processes and media in a health setting. Hawes and Staff.

**560 U 8**  
**Medical Communications Media II**

Sp. 3 1-hr. cl., 5 2-hr. clinical experience.  
 Prereq.: 550.  
 Diagnosis and planning for communication services in various health environments. Burke and Staff.

## Medical Dietetics

(School of Allied Medical Professions)

Office: 516 School of Allied Medical Professions Building, 1583 Perry Street

Associate Professor Anderson (Acting Division Director); Professors Lewis (Emeritus) and Molleson; Associate Professors Allred, Casbergue, and Scobie (Emeritus); Assistant Professors Breese, Calvert, Ebro, Griesen, Herrick, Johnson, Seubert, and Sharp; Instructors Gordon, Kram, and J. White; Clinical Instructors Behm, Bethel, Brantford, Cox, Gernes, Hutter, Jones, Pyles, and S. White.

**201 U 1**  
**Introduction to Medical Dietetics**

Sp. 2 cl.  
 Basic knowledge and experience in functional and sociological aspects of responsibilities of the medical dietitian. Anderson and Staff.

**410 U 6**  
**Introduction to Patient Dietary Care**

A. 4 cl., 6-hr. clinical study.  
 Prereq.: Home Ec. 310.  
 Not open to students with credit for 310.  
 Principles and practice in the dietary care of the hospital patient. J. White and Staff.

**411 U 1**  
**Electronic Data Processing in Dietetics**

A. 1 cl., clinical experience.  
 Prereq.: Enrollment in Med. Diet. or permission of instructor.  
 Introduction to basic computer concepts and the application of these concepts to dietetic systems. Casbergue.

**421 U 6**  
**Management in Dietetics**

A. 4 cl., 1 4-hr. lab.  
 Prereq.: Home Ec. 314.  
 Management in food service systems emphasizing quality of food, production planning, work organization, financial controls in quantity food preparation for regular and modified diets. Casbergue and Ebro.

**422 U 6**  
**Management in Dietetics**

Sp. 3 cl., 3 3-hr. lab.  
 Prereq.: 421.  
 Principles and recent trends in menu planning and food procurement in food service systems; responsibility for writing and implementing menus in hospital food services. Casbergue and Ebro.

**521 U 6****Nutrition and Human Metabolism**

W. 4 cl., 5-hr. clinical study.

Prereq.: Home Ec. 310, Physiol. Chem. 312 or concur., Physiol. 312 or equiv.; Junior standing or permission of instructor.

Metabolism of essential nutrients at cellular and intact levels of the body; causes, results, and dietary management of alterations in metabolism of these nutrients. Seubert and J. White.

**522 U 6****Nutrition and Human Metabolism**

Sp. 4 cl., 5-hr. clinical study.

A continuation of 521.

Seubert and J. White.

**523 U 6****Nutrition and Human Metabolism**

Su. 4 cl., 5-hr. clinical study.

Prereq.: 522.

Continuation of 522.

Seubert and J. White.

**636 U 3****Dietitian as a Teacher**

Su. 2 cl., 3-hr. clinical study.

Prereq.: Med. Diet. senior standing.

Educational principles and practices as applied to the teaching responsibilities of the dietitian. Johnson.

**637 U 5****Community Nutrition**

A, W. 2 cl., 6-hr. clinical study.

Prereq.: Senior standing or permission of instructor.

Public health nutrition programs and their services to the community, with particular reference to nutrition problems of special groups of the population. Calvert.

**638 U G 5****Pediatric Nutrition**

A, W. 3 cl., 4-hr. clinical study.

Prereq.: Grad. or senior standing in Med. Diet. and permission of instructor.

The nutrition of children; the influence of physical, psychological, and social growth and development from infancy through adolescence. Anderson and Pediatric Staff.

**645 U 10****Advanced Medical Dietetics I**

A, W. 4 cl., 2-hr. conf., 20-hr. clinical study.

Prereq.: Senior standing and permission of instructor.

Advanced study and evaluation of disturbed metabolic processes affecting human nutrition and solution of the complex dietetic problems accompanying them. Breese and Staff.

**646 U G 10****Advanced Medical Dietetics II**

Sp. 4 cl., 2-hr. conf., 20-hr. clinical study.

Prereq.: 645, senior or grad. standing and permission of instructor.

Continuation of 645. Breese and Staff.

**693 U G 1-5****Individual Studies in Nutrition or Dietetics**

Su, A, W, Sp.

Prereq.: Grad. or senior standing in Med. Diet. and permission of instructor.

Problems in various phases of nutrition or medical dietetics not included in current course offerings. Molleson and Staff.

**830\* G 3****World Nutrition**

Su. 2 1½-hr. cl.

Prereq.: Permission of instructor.

Not open to students with credit for Prev. Med. 830.

A multidisciplinary approach to the study of nutrition in developing countries; emphasis on food supply, nutritional status, infant and child malnutrition and nutrition survey methods. Molleson.

**856 G 3****Nutrition in Systemic Disease**

Sp. 2 1½-hr. cl.

Prereq.: Permission of instructor.

Not open to students with credit for Prev. Med. 856.

The physio-pathological background of systemic disease and the rationale of specific diets in their prevention and treatment. Molleson and Medical Staff.

**858†\* G 3****Community Nutrition**

Sp. 2 1½-hr. cl.

Prereq.: 638 and 856, or permission of instructor.

Not open to students with credit for Prev. Med. 858.

Methods of discovering problems in public health nutrition and practical application of nutrition information for improvement of nutritional status at various age levels. Anderson.

**898 G 1****Interdepartmental Seminar in Nutrition and Food Technology**

(See under Interdepartmental Seminars, Course Offerings catalog.)

## Medical Illustration

(School of Allied Medical Professions)

Office: 206 School of Allied Medical Professions Building, 1583 Perry Street

**Instructor** Kreutzfeld (Division Director); **Assistant Professors** Shepard (Emeritus) and Teoli; **Instructors** Keating, Ollila, and Prosser; **Clinical Instructor** Kramer.

**100 U 0****Medical Illustration Field Experience**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Practical application of medical illustration techniques in a functioning hospital department of medical illustration.

640 U 5

**Techniques**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 45 cr. hrs.

Advanced study for students in medical illustration including preparation of charts, graphs, medical and surgical illustrations, exhibits and general work for a medical center.

693 U 5

**Individual Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 45 cr. hrs.

Advanced study in scientific illustration as related to medicine.

## Medical Microbiology

Office: 5072 Graves Hall, 333 West 10th Avenue

**Professors** Cramblett (Chairman), Bowman, Hamparian, Kapral, Lang, Macpherson, Saslaw, and Somerson;  
**Associate Professors** Haynes, Ottolenghi, Perkins, and Pollack; **Assistant Professors** Azimi, Fass, and Thomas;  
**Instructor** Durham.

624 P G 3

**Medical Microbiology**

A. 3 2-hr. lab.

Prereq.: Permission of instructor.

Morphologic, physiologic, and serologic characteristics of pathogenic microorganisms; the epidemiology and pathogenesis of infectious diseases; methods of diagnosis, prevention, and treatment.

625 P G 4

**Medical Microbiology**

W. 40-hr. lec. during 7 wks.

Prereq.: 624.

Continuation of 624. Staff.

626 P G 5

**Medical Microbiology**

Sp. 20-hr. lec., 70-hr. discussion and lab. during 7 wks.

Prereq.: 625 or permission of instructor.

A more extensive and intensive application of basic principles of medical microbiology to infectious diseases.

701 P G 3

**Fundamentals of Medical Immunology**

A. 3 cl.

Prereq.: Permission of instructor.

Fundamentals of immunologic phenomena in the normal and diseased state, with primary emphasis on application of immunology in medicine. Lang.

744†\* P G 4

**Clinical Medical Mycology**

A. 2 cl., 2 2-hr. lab.

Prereq.: 624, 625, and permission of instructor; Bot. 662.01 recommended.

An advanced course in medical mycology with emphasis on isolation of human pathogenic fungi from patients; comprehensive laboratory diagnosis; serology; microscopic pathology; staining; and animal applications. Pollack.

754 P G 3

**Medical Virology**

S. 3 1-hr. lec.

Prereq.: 625; Biochem. 613 or 709 and 623 or 710, or Physiol. Chem. 611 and 612, or permission of instructor.

Primary emphasis on viruses important to man; fundamental properties of viruses, host cell-virus interaction, pathogenesis, and immunity. Hamparian, Thomas, and Cramblett.

764 P G 4

**Bacteriophagy**

Sp. 2 1-hr. lec., 2 2-hr. lab.

Prereq.: 625 or permission of instructor.

Various phage-bacterium systems used to study and to exemplify basic mechanisms involved in virus infections. Bowman.

793

**Individual Studies in Medical Microbiology**

Prereq.: Enrollment in the College of Medicine or permission of instructor.

(When registration is for 3 professional cr. hrs., an additional 3 hr. professional course must be taken.)

793.01 Diagnostic and Clinical Virology P 3, 6, 12, 18 G 3-15

1, 2, or 3 months.

Su, A, W, Sp.

793.02 Problems in Virology P 3, 6, 12, 18 G 3-15

Su, A, W, Sp. 3 months.

Must repeat to 18 cr. hrs. for professional credit.

793.03 Problems in Experimental Bacterial Viruses P 3, 6, 12, 18 G 3-15

1, 2, 3, or 4 months.

Su, A, W, Sp.

Repeatable to a maximum of 24 cr. hrs. for professional credit.

793.04 Problems in Mycoplasma Research P 3, 6, 12, 18 G 3-15

3 or 4 months.

Su, A, W, Sp.

Must repeat to 18 or 24 cr. hrs. for professional credit.

793.05 Medical Immunology P 3, 6, 12, 18 G 3-15

1, 2, 3, or 4 months; offered all months.

Su, A, W, Sp.

Repeatable to a maximum of 24 cr. hrs. for professional credit.

793.06 Problems in Medical Microbiology P 3, 6, 12, 18 G 3-15

1, 2, 3, or 4 months; offered all months.

Su, A, W, Sp.

Repeatable to a maximum of 24 cr. hrs. for professional credit.

**793.07 Diagnostic and Clinical Microbiology**

P G 6-18

1, 2, 3, or 4 months (full time)

Su, A, W, Sp.

Prereq.: 626 and permission of instructor.

Repeatable to a maximum of 24 cr. hrs.

Experience in isolation and identification of micro-organisms from clinical specimens.

**Clinical Microbiology**

(See Path. 793.07)

**Infectious Diseases**

(See Ped. 793.03)

**794****Group Studies**

1 month, offered all months.

P 3 or 6

Su, A, W, Sp.

G Arr.

Prereq.: 624 and 625, or equiv.; permission of instructor.

(When registration is for 3 professional cr. hrs., an additional 3 hr. professional course must be taken.)

**794.01 Immunological Diseases**

Directed reading and discussion of human diseases with immunological features; primary attention is directed toward the immunological phenomena underlying connective tissue and specific organ diseases. Lang.

**814**

G 1

**Seminar in Medical Microbiology**

A, W, Sp.

Prereq.: Med. Microbiol. grad. standing or permission of instructor.

Repeatable with permission of instructor to a maximum of 9 cr. hrs.

**824**

G 3

**Medical Parasitology**

Sp. 2 1-hr. lec., 1 3-hr. lab.

Prereq.: 626 and permission of instructor.

Discussion of structure, growth, development, epidemiology, and pathogenesis of animal parasites infectious for man, together with practical experience in identification.

**834\***

G 5

**Experimental Medical Microbiology**

Sp. 2 cl., 2 4-hr. lab.

Prereq.: 624, 625, and permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

An advanced course in the theory, practice, and analysis of current experimental procedures used in the study of human microbial pathogens. Pollack and Lang.

**844\***

G 2

**Mycoplasma, Rickettsiae, and Chlamydiae**

A. 2 1-hr. lec.

Prereq.: 625 or Microbiol. 607.

Mycoplasmas and L-forms, members of the Bedsoniae group, Rickettsiae and Trachoma agents. Somerson and Pollack.

**854†\***

G 3

**Molecular Basis of Antibiotic and Chemotherapeutic Action**

Sp. 3 1-hr. lec.

Prereq.: 625; Physiol. Chem. 612; or Biochem. 612 or 707 and 622 or 708; or Microbiol. 761; or permission of instructor.

Action of antibiotic and chemotherapeutic agents on specific sites in the metabolism and/or structures of cells stressing the comparative biochemistry of bacterial and animal cells. Ottolenghi and Azimi.

**864**

G 3

**Dynamic Aspects of Bacterial Infections**

A. 3 1-hr. lec.

Prereq.: 625 or Microbiol. 625 or equiv. or permission of instructor.

An analysis of the dynamic interrelationships between the host's and parasite's inherent physiological capabilities and how these expressions (other than specific immunity) are mutually modified. Kapral and Ottolenghi.

**994**

G 2-6

**Group Studies in Medical Microbiology**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 24 cr. hrs.

Investigation of special areas of medical microbiology.

**999**

G Arr.

**Research in Medical Microbiology**

Su, A, W, Sp.

Prereq.: Grad. standing in Med. Microbiol.

Research for thesis or dissertation purposes only.

## Medical Record Administration

(School of Allied Medical Professions)

Office: 231 School of Allied Medical Professions Building, 1583 Perry Street

Instructor Thomson (Division Director.)

**501**

U 5

**Medical Record Science I**

A. 5 cl.

Prereq.: Permission of instructor.

An orientation to medical records including a history of medical records, uses, types, component parts of the record, numbering and filing systems, and the responsibilities of the medical record administrator.

**502**

U 5

**Medical Record Science II**

W. 4 cl., 1 3-hr. lab.

Prereq.: 501.

Classification, coding, and indexing of diseases and surgical procedures; orientation and development of indexes in the medical record department.



**503 U 5**

**Medical Record Science III**

Sp. 4 cl., 1 3-hr. lab.

Prereq.: 502.

The medical library in the hospital; microfilming techniques and procedures; statistics; research; and automatic data processing in medical records.

**510 U 3**

**Legal Aspects of Medical Records**

W. 3 cl.

Prereq.: 501 or permission of instructor.

A detailed analysis of the medicolegal aspects of medical records.

**525 U 2**

**Medical Record Organization and Administration I**

A. 2 cl.

Prereq.: Permission of instructor.

Orientation to organization and administration of a medical record department, hospital and medical staff organization; and hospital committees.

**526 U 2**

**Medical Record Organization and Administration II**

W. 2 cl.

Prereq.: 525.

Medical record department organization; the typing pool; other departments within the hospital and how they relate to the medical record department.

**527 U 2**

**Medical Record Organization and Administration III**

Sp. 2 cl.

Prereq.: 526.

The preparation of office manuals; office planning and layout; budgets, reports, and correspondence.

Introduction to the medical laboratory, its organization, functions, responsibilities, opportunities, instruments, and methods. Anderson and North.

**508 U 3**

**Medical Technology Laboratory**

Su. 2 cl., 1 3-hr. lab.

Prereq.: Admission to Med. Tech. and permission of instructor.

Laboratory techniques in parasitology. Wilson.

**511 U 9**

**Medical Technology Laboratory**

Prereq.: Admission to Med. Tech. and permission of instructor.

Prereq.: Admission to Med. Tech.

Laboratory techniques in hematology, coagulation, and urinalysis. Anderson, Lewis, and North.

**512 U 9**

**Medical Technology Laboratory**

A. 27 lab. hrs.

Prereq.: Admission to Med. Tech. and permission of instructor.

Laboratory techniques in clinical bacteriology and mycology. Anderson and Wilson.

**513 U 9**

**Medical Technology Laboratory**

W. 27 lab. hrs.

Prereq.: Admission to Med. Tech. and permission of instructor.

Laboratory techniques in clinical immunology and immunohematology. Gregory and Wilson.

**514 U 9**

**Medical Technology Laboratory**

Sp. 27 lab. hrs.

Prereq.: Admission to Med. Tech. and permission of instructor.

Laboratory techniques in clinical chemistry. Anderson.

## Medical Technology

(School of Allied Medical Professions)

Office: 535 School of Allied Medical Professions Building, 1583 Perry Street

**Professor** Macpherson (Division Director); **Associate Professor** Sutton (Assistant Division Director); **Professor** Stevenson; **Assistant Professors** Anderson, Grannis, Gregory, and Lott; **Instructors** Ayers, Lewis, North, and Wilson; **Clinical Instructors** Aros, Bitzel, Kasper, Kern, Rohyans, and Sherman.

For related courses see **Pathology**.

**480 U 5**

**Introduction to Medical Technology**

W, Sp. 3 cl., 6 lab. hrs.

Prereq.: 15 cr. hrs. in biological sciences, Chem. 211, and admission to the Med. Tech. division; or permission of instructor.

**515 U 10**

**Clinical Practice in Medical Technology**

Su, A, W, Sp. 5 8-hr. labs.

Prereq.: 511, 512, 513, and 514 and permission of instructor.

Application of medical laboratory techniques under supervision in the clinical laboratories of University Hospital. Macpherson and Staff.

## Medicine

Office: N-1013 University Hospital, 410 West 10th Avenue

**Professors** Warren (Chairman), Allen, Atwell, Ayres, Balcerzak, Beman, Bouroncle, Bromberg, Browning, DeLor, Doan (Emeritus), Fancher (Emeritus), Ferris, J. Forman (Emeritus), W. Forman, Heisel, Kezdi, Knies, Lowney, McCoy, W. Mitchell, Myers, Nelson (Emeritus), Palmer (Emeritus), Paulson, Prior, Rothermich, Ryan, Saslaw, Schoene, Shillito, Silberstein, Skillman, Wall, H. Wilson, and Wooley; **Associate Professors** Arnoff, Bradley, Carr, DeMerit, Donnerberg, Folk, Fulton, George, Guthrie, Hatcher, Hattfield, Haynie, (Emeritus), Hummel, J. R. Huston, E. Johnson, Keller, Kruger, Leighton, Lewis, LoBuglio, Long, Love, Metz, Morrice, Perkins, Phelps, Phillips, Read, F. Rose, Ruppert, Schmitt, Sherard, Shuttleworth, Stein, Taguchi, Talbott, Tronstein, Tennenbaum, Tzagournis, Watson, and Wise; **Assistant Professors** M. Anthony, Arnoff, Barker, Baum, Bell, Bergen, Bethel, Bixel, Bohl, Bolton, G. Bonnell, Boyle, Bronstein, R. Buchan, Bunn, Bunner, Burkholder, Bush, Caldwell, Call, Carter, Cassel, Cataland, Clark, Clendenan, Clodfelter, Condon, Conn, Cook, Cross, Cunningham, G. Davis, Engelman, Evans, Fass, Fish, Fontana, Gallagher, Goldberg, Goldmeier, Goulder, Gourgoutis, Greigor, Grubbs, Hoelflinger, Hoffman, Hughes, Humphrey, Hyman, Jacques, Jamison, P. Johnson, Keith, Kirk, Klages, Lach, Landen, Larrimer, Lefken, Levine, Little, Lubow, Lutz, Malarkey, Martin, Marks, Matre, Mazzaferri, McCreary, McGavran, McKittrick, Mehbod, Mekhjian, Merkle, Messick, Metzger, J. Millhon, W. Millhon, Morton, Murnane, Murphy, Obetz, O'Brien, Pollack, Pritchett, Ritchlin, Robinson, S. Rose, Rosenow, Ross, Sagone, Schaal, Seidensticker, Seyler, Shearer, Sheline, Shoman, W. Smith, Sotos, Stevens, Stevenson, Tabesh, Thomas, Tiber, Vincent, Watson, H. Williams, T. Williams, Williard, and Zangmeister; **Instructors** Adil, R. Bonnell, Brandt, Brownlee, J. Buchan, Cortes, Corpus, N. Davis, DeGuzman, Fuller, Gardener, Gerlinger, Gutterman, Hamilton, Harding, Herranen Inglis, Jennings, Kataria, Krakoff, Kerr, Lawyer, Liepack, Long, Ludwig, Marshall, Mattingly, Miller, Munsey, Orlando, Perez, Perrine, Reinhart, Simon, Sivon, D. Smith, Stitts, Stock, Stout, Vallee, Vaughan, Weinberg, and Wetterauer.

### 661 P 2

#### Principles of Medicine

Sp. 2 cl.

Prereq.: Dent. 3rd yr. standing.

A survey course in medicine to dental students considering the infectious, deficiency, and systemic diseases; representative diseases are selected for detailed consideration and demonstrations.

### 714 P 6

#### Ward Clinics in Infectious Diseases

1 month, offered all months except June.

Prereq.: Permission of instructor.

(Daily formal instruction from 8 a.m. to 6 p.m.; student on call throughout 24 hours daily.)

Clerkship and seminars on common and unusual infectious diseases. Saslaw.

### 716 P 6

#### Ward Clinics in Pulmonary Disease

1 month, offered all months except June.

Prereq.: Permission of instructor.

(Daily formal instruction from 8 a.m., to 6 p.m.; student on call throughout 24 hours daily.)

Clerkship and seminars on pulmonary diseases.

### 740 P 6, 12, 18

#### Ambulatory Clinics in Medicine

1 month, offered all months except June.

Prereq.: Permission of instructor.

Repeatable to a maximum of 18 cr. hrs.

The diagnosis and treatment of ambulatory patients with general and special medical problems.

### 751 P 6, 12, 18

#### Medical Clerkships

1 month, offered all months except June.

Prereq.: Permission of instructor.

Repeatable to a maximum of 18 cr. hrs.

(Daily formal instruction from 8 a.m. to 6 p.m.; student on call throughout 24 hours daily.)

Ward clerkship in the following subspecialties of medicine, with bedside, didactic, and seminar instruction.

- 751.01 Allergy
- 751.02 Cardiology
- 751.03 Dermatology
- 751.04 Endocrinology
- 751.05 Gastroenterology
- 751.06 Genetics
- 751.07 Hematology
- 751.08 Neurology
- 751.09 Renal Diseases
- 751.10 Rheumatology
- 751.11 Advanced Clinical Clerkships

### 770 P 3

#### Basic Science Review

1 month, May.

Prereq.: Permission of instructor.

Didactic review of new basic science developments; practice in electrocardiographic and phonocardiographic interpretation; elements of office practice and community relations.

### 793 P 6, 12, 18 G 1-5

#### Individual Studies in Medicine

All months, 1 or more months to be elected.

Prereq.: Permission of instructor.

Repeatable to a maximum of 18 cr. hrs.

Research on a minor problem under faculty supervision in the following specialties of medicine:

- 793.01 Allergy
- 793.02 Cardiology
- 793.03 Dermatology
- 793.04 Endocrinology
- 793.05 Gastroenterology
- 793.06 Genetics
- 793.07 Hematology
- 793.08 Infectious Diseases
- 793.09 Neurology
- 793.10 Pulmonary Diseases
- 793.11 Renal Diseases
- 793.12 Rheumatology

### 794 P 6, 12, 18

#### Group Studies in Medicine

Prereq.: Permission of instructor.

Repeatable to a maximum of 18 cr. hrs.

Group studies of special topics in medicine.

**794.01 Developmental Disabilities  
(Mental Retardation)**

Full time—5 days a week

Interdisciplinary comprehensive exposure to medical, allied medical, epidemiological, psychological, social, sociological, educational, and legal aspects and problems of mental retardation with a community health orientation.

**797 U P G 1-5**

**Interdepartmental Seminar**

Su, A, W, Sp.

(See under Interdepartmental Seminars.)

a. Neuroscience

**798 P 18**

**Internship in Medicine**

Su, A, W, Sp.

12 months full time, beginning July 1.

Prereq.: Appointment as Intern, University Hospital.

Repeatable to a maximum of 216 cr. hrs.

Rotation through medical ward services and hospital emergency room; primary responsibility for patient care; attending and work rounds; staff conferences.

**799 P 18**

**Residency in Medicine**

Su, A, W, Sp.

12 months full time, beginning July 1.

Prereq.: Appointment as Resident, University Hospital.

Repeatable to a maximum of 216 cr. hrs.

Rotation through medical subspecialty, clinical, and outpatient services; consultative activities, supervisory and teaching responsibilities in patient-care team; rounds; conferences.

**850 G 1-3**

**Seminar in Medicine**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Discussion of pertinent literature and research projects in various subspecialty areas with emphasis on basic science concepts. Warren and Staff.

- 850.01 Allergy
- 850.02 Cardiology
- 850.03 Dermatology
- 850.04 Endocrinology
- 850.05 Gastroenterology
- 850.06 General Medicine
- 850.07 Genetics
- 850.08 Hematology
- 850.09 Infectious Diseases
- 850.10 Neurology
- 850.11 Pulmonary Diseases
- 850.12 Renal Diseases
- 850.13 Rheumatology

**999 G Arr.**

**Research in Medicine**

Su, A, W, Sp.

Research for thesis or dissertation purposes only.

## Medicine, College of

Office: 209 College of Medicine Administration Center,  
370 West 9th Avenue

**611 P 1**

**The Development of Medicine and the Medical Profession**

A, W, Sp. 10 cl.

Prereq.: Enrollment in the College of Medicine.

The evolution of the theory and practice of medicine and of the social role of the physician from the earliest times. Burnham.

**651 P 6**

**Introduction to Medicine**

Su, A, W, Sp.

Prereq.: Enrollment in the College of Medicine.

Repeatable to a maximum of 12 cr. hrs.

Introducing basic concepts of major disease mechanisms, with patient centered learning; study of the health care delivery systems and the resources of medical Informational Services.

**652 P 6, 12**

**Nature of Life Processes in Medicine I**

Su, A, W, Sp.

Concur.: 651.

Repeatable to a maximum of 24 cr. hrs.

Macrostructure, microstructure, and function of the human body including biochemical reactions and normal defense mechanisms; study of human behavior, growth, and development; introduction to the tools of physical diagnosis.

**653 P 6, 12, 18**

**Nature of Life Processes in Medicine II**

Su, A, W, Sp.

Prereq.: 652.

Repeatable to a maximum of 36 cr. hrs.

Continuation of 652.

**654 P 6, 12, 18**

**The Pathophysiology and Manifestation of Disease I**

Su, A, W, Sp.

Prereq.: 653.

Repeatable to a maximum of 36 cr. hrs.

Multidisciplinary presentation of disease mechanisms and pharmacodynamics correlating structure and function with its cardinal manifestations; elective experience in basic science fields; clinical learning in outpatient setting.

**655 P 6, 12, 18**

**The Pathophysiology and Manifestation of Disease II**

Su, A, W, Sp.

Prereq.: 654.

Repeatable to a maximum of 36 cr. hrs.

Continuation of 654.

**656 P 6, 12, 18**  
**The Pathophysiology and Manifestation of Disease III**

Su, A, W, Sp.

Prereq.: 655.

Repeatable to a maximum of 54 cr. hrs.

Continuation of 655.

**671 P 6, 12, 18**  
**Clinical Medicine I**

Su, A, W, Sp.

Prereq.: 656.

Didactic and clinical instruction in medicine, obstetrics and gynecology, pediatrics, psychiatry, and surgery; experience in outpatient, community, and inpatient services.

**672 P 6, 12, 18**  
**Clinical Medicine II**

Su, A, W, Sp.

Prereq.: 671.

Continuation of 671.

**673 P 6, 12, 18**  
**Clinical Medicine III**

Su, A, W, Sp.

Prereq.: 672.

Continuation of 672.

**674 P 6, 12, 18**  
**Clinical Medicine IV**

Su, A, W, Sp.

Prereq.: 673.

Continuation of 673.

**675 P 6, 12, 18**  
**Clinical Medicine V**

Su, A, W, Sp.

Prereq.: 674.

Continuation of 674.

**676 P 6, 12, 18**  
**Clinical Medicine VI**

Su, A, W, Sp.

Prereq.: 675.

Continuation of 675.

**677 P 6, 12, 18**  
**Clinical Medicine VII**

Su, A, W, Sp.

Repeatable to a maximum of 72 cr. hrs.

Prereq.: 676.

Continuation of 676.

**797 P G 1-5**  
**Interdepartmental Seminars**

Su, A, W, Sp.

Repeatable by permission of College Secretary.

(See under Interdepartmental Seminars, Course Offerings catalog.)

- a. Professional Responsibilities and the Great Issues of Our Time.

## Medieval and Renaissance Studies

Office: 320 Main Library, 1858 Neil Avenue

**Professor Kahrl (Director); Advisory Committee, Professors Hoppin (Music), Keller (Romance Languages), and Utley (English); Associate Professors Matejic (Slavic Languages) and Morrow (Theatre); Assistant Professors Frantz (English), Kratz (Classics), Lynch (History), Machamer (Philosophy), Mealy (History of Art), and Vredevelde (German).**

**210 U 5**  
**The Court of Charlemagne**

A. 3 cl., 2 hr. arr.

The Carolingian Renaissance: a unified interpretation of a crucial period in the transition of Europe from the classical age to the early Middle Ages.

**211 U 5**  
**Idealism and Scepticism in the 12th and 14th Centuries**

W. 3 cl., 2 hr. arr.

Characteristic expressions of idealism in the art, literature, and philosophy of 12th century Europe contrasted to the scepticism of the later medieval period.

**212 U 5**  
**The Culture of a City State in the Renaissance**

Sp. 3 cl., 2 hr. arr.

Florence, 1200-1550; the study of an Italian Renaissance city-state with attention to its political, social, and economic structure; its religious, intellectual and artistic activity.

**213 U 5**  
**Medieval Slavic Civilization**

W. 4 cl., 1 hr. arr.

Interpretative and analytical study of the major social, religious, ethical, and literary ideas and events of medieval Slavic civilization.

**214 U 5**  
**The Golden Age of Islamic Civilization**

Sp. 4 cl., 1 hr. arr.

The Baghdad Caliphate of Harun ar-Rashid from 786 to 861 A.D.

**694 U G 5**  
**Group Studies**

W.

Prereq.: 10 cr. hrs. in Med. & Ren. Studies at the 200 level.

Repeatable to a maximum of 15 cr. hrs.

Interdisciplinary group studies of selected topics in Medieval and Renaissance culture and civilization.

**H783 U 3-5**  
**Honors Course**

Su, A, W, Sp.

Prereq.: 4th yr. standing with a grade of A in at least half of the courses in the student's major area of study and an average of B in the remainder; permission of instructor under whose supervision the work is to be completed and the Arts and Sciences Honors Committee.

At least 2 qtrs. are required of candidates for the Bachelor of Arts degree **with distinction** in Medieval and Renaissance Studies.

Failure to receive a mark of C in this course is disqualification for special honors.

Repeatable to a maximum of 15 cr. hrs.

A program of study will be arranged for each student, with individual conferences, reports, and Honors thesis.

## 888 G 5

### Medieval and Renaissance Culture

W. 4 cl.

Prereq.: One or more 600-level courses or equiv. in subject offered, appropriate to student's field of specialization, or permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Selected topics in medieval culture and civilization, offered cooperatively by two or more departments in the Colleges of the Arts and Sciences.

## 889 G 5

### Medieval and Renaissance Literature

Sp. 4 cl.

Prereq.: One or more 600-level courses or equiv. in subject offered, appropriate to student's field of specialization, or permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Interdisciplinary seminar directed by two or more teachers from separate departments. Topic to be announced.

# Metallurgical Engineering

Office: 141A Metallurgical Engineering Building, 116 West 19th Avenue

**Regents Professor** Fontana (Chairman), **Professors** Beck, Hirth, Meyrick, Powell, Rapp, Speiser, Spretnak, St. Pierre, Staehle, and Williams; **Associate Professors** Boorstein and Rigner; **Battelle Visiting Professor**

## 200 U 3

### Introduction to Metallurgical Engineering

A. 3 cl.

Prereq.: 2nd yr. standing in Met. E.

Substantive survey of the profession of metallurgy and metallurgical engineering; science versus engineering; the design function and professional responsibilities; historical heritage of metallurgical engineering. Rapp.

## 201 U 3

### Principles of Materials

W. 3 cl.

Prereq.: Math. 153, Physics 133, Chem. 204; or equiv. An introductory development of the chemical and physical properties of materials. St. Pierre.

## 300 U 4

### Materials Science

Sp. 4 cl.

Prereq.: Chem. 204.

The structure of materials and the correlation of structure to physical and mechanical behavior; advanced materials and environmental effects. Boorstein.

## 301 U 3

### Materials Science

A, W, Sp. 3 cl.

Prereq.: Chem. 204.

The atomic and microscopic structure of materials and the control of structure to affect the physical and mechanical properties. Beck, Boorstein, and Rigney.

## 330 U 4

### Thermodynamics of Materials

Sp. 4 cl.

Prereq.: Chem. 205.

Fundamental concepts of thermodynamics and their application to engineering materials and systems; introduction to the laws of thermodynamics, principles, of chemical equilibrium, and solution behavior. St. Pierre.

## 430 U 4

### Chemical Metallurgy I

A. 3 cl., 1 3-hr. lab.

Prereq.: 330 or equiv.

Metallurgical calculations; energy and mass balances; analysis of steady and non-steady state processes; heat and mass transfer applied to metallurgical processes. Boorstein.

## 431 U 4

### Chemical Metallurgy II

W. 3 cl., 1 3-hr. lab.

Prereq.: 430.

Graphical representation of phase equilibria including important M-O-C and M-O-S systems; treatment of gas-solid reaction kinetics including oxidation, reduction, evaporation, retorting, etc.; electrochemical metallurgy processes. Rapp.

## 440 U 3

### Physical Metallurgy I

Sp. 3 cl.

Crystallography; bonding; physical properties of single crystals, polycrystals; defects in crystals; diffusion; recovery and recrystallization. Rigney.

## 450 U 3

### Physical Metallurgy II

A. 3 cl.

Prereq.: 440; concur. 480a.

Grain growth; partitioning of solute to defects and grain boundaries, nucleation theory; phase diagrams. Powell.

## 480 U 1

### Physical Metallurgy Laboratories

A, W, Sp. 1 3-hr. lab.

Prereq. or concur.: 450 and permission of instructor.

Repeatable to a maximum of 4 cr. hrs.

The student must register for specific studies in the areas indicated below, and may not register for more than one at a time. Courses must be scheduled in the order listed.

- a. Furnace design and temperature measurement. Meyrick.
- b. Diffusion, recrystallization, and phase diagrams. Hirth.
- c. Isothermal transformation, quenching and tempering, and hardenability. Powell.
- d. Principles of X-ray diffraction and applications to the study of materials. Rigney.

#### 489 U 2 Industrial Experience

A. 2 cr. hrs. for each summer's work.

Repeatable to a maximum of 4 cr. hrs.

Register for course and submit report on experience during the Autumn Quarter following the summer in which industrial experience was obtained; one summer or 10 weeks of approved work in metallurgical industries. Williams.

#### 502\* U G 3 Advanced Structure of Materials

W. 3 cl.

Prereq.: 300, 301, or equiv.

Not open to students majoring in Met. E.

Means of obtaining and controlling microstructure; relationship of structure to properties; survey of alloy systems; environmental limitations of materials. Meyrick.

#### 510 U G 4 Foundry Technology

Sp. 3 cl., 1 2-hr. lab.

Prereq.: 450 or permission of instructor.

Industrial-type safety glasses must be worn in laboratory. No contact lenses permitted.

Introduction to the manufacture of engineering components by metal casting processes involving molding, gating, risering, melting, and solidification. Williams.

#### 520 U G 4 Chemical Metallurgy III

Sp. 3 cl., 1 3-hr. lab.

Prereq.: 431 or permission of instructor.

Structure and properties of liquid metals and alloys; thermodynamics of liquid metallic solutions; liquid metal-gas and slag reactions; solidification and zone refining. Boorstein.

#### 550 U G 3 Physical Metallurgy III

W. 3 cl.

Prereq.: 450; concur. 480b.

Principles of phase transformations in the solid state. Powell.

#### 551 U G 3 Physical Metallurgy IV

Sp. 3 cl.

Prereq.: 550.

Physical metallurgy of plain-carbon and alloy steels. Powell.

#### 553 U G 3 Physical Metallurgy V

A. 3 cl.

Prereq.: 551.

Relationships between the microstructure and the mechanical properties of metals and alloys. Rigney.

#### 560 U G 3 Mechanical Metallurgy

A. 3 cl.

Prereq.: Engr. Mech. 420.

Behavior of metals under simple and combined stress systems; elements of elastic theory, plastic deformation, dislocation theory, strength theories, and fracture. Spretnak.

#### 589 U 2 Inspection Trip

Sp. Taken between W. and Sp. Qtrs.

One week trip to visit industrial plants and laboratories; report required; maximum expense, \$90.00. Williams.

#### 610 U G 3 Foundry Molding Materials

A. 3 cl.

Prereq.: 510.

A study of materials used in compounding of sand mixtures and the effect of thermal shock upon the properties of molded masses. Williams.

#### 611 U G 3 Foundry Molding Methods, Gating, and Riser

W. 3 cl.

Prereq.: 510.

The manufacture of sand molds by various methods; gating and risering—a study of fluid flow and solidification to produce sound castings. Williams.

#### 615 U G 4 Mechanical Forming of Metals

W. 3 cl., 1 3-hr. lab.

Prereq.: 560 or equiv.

Elements of plasticity theory. Fundamental aspects of forming metals by forging, wire drawing, rolling, and extrusion. Spretnak.

#### 620 U G 3 Process Metallurgy

A. 3 cl.

Prereq.: 520 or equiv.

Analysis and design of processes for extracting and refining of metals. St. Pierre.

#### 635 U G 3 Corrosion

A, Sp. 2 cl., 1 2-hr. lab.

Prereq.: Engr. 4th yr. standing.

Fontana.

#### 670 U G 3 Engineering Metallurgy I

W. 3 cl.

Prereq.: 551.

Basic properties of metals and alloys, cost structure, design factors, specifications, and statistical methods; selection of metals and alloys, service failures. Staehle.

**671 U G 3**  
**Engineering Metallurgy II**

Sp. 3 cl.  
 Prereq.: 670.  
 Continuation of 670. Staehle.

**675\*† U G 3**  
**Materials of Nuclear Technology**

A. 3 cl.  
 Prereq.: 300, 301, or equiv.  
 The physical metallurgy of reactor materials; the effects of reactor environment on the structure, and on the physical and mechanical properties of these materials. Staehle.

**693 U G 1-6**  
**Individual Studies in Metallurgical Engineering**

Su, A, W, Sp.  
 Prereq.: Permission of dept.  
 Repeatable to a maximum of 9 cr. hrs.  
 All studies (library and/or research investigations) are under the close direction of instructors; comprehensive report required.  
 a. The properties of metals and alloys.  
 b. Production and refining of metals.  
 c. Metallurgical equilibria.  
 d. Corrosion engineering.  
 e. Cast metals.

**694 U G 2-6**  
**Group Studies in Metallurgical Engineering**

Su, A, W, Sp.  
 Prereq.: Permission of instructor.  
 Repeatable to a maximum of 6 cr. hrs.

**710 U G 3**  
**Casting Control**

Sp. 3 cl.  
 Prereq.: 610 or 611.  
 A study of the factors involved in the elimination of defective products. Williams.

**714 U G 5**  
**Environmental Pollution Abatement**

W. 5 cl.  
 Prereq.: Senior or grad. majors in engineering or sciences.  
 Not open to students with credit for Agr. E. 714, Chem. E. 714, and Civil E. 714.  
 (Cross-listed in the Depts. of Agr. E., Chem. E., and Civil E.)  
 Problems, philosophies, principles, and methods of pollution abatement in the total environment; quantitative approaches to waste management in air, water and land systems. Rigney.

**730 U G 3**  
**Thermodynamics of Alloys**

A. 3 cl.  
 Prereq.: 520 and 550, or equiv.  
 Thermodynamics of liquid and solid alloy systems; numerous problems. St. Pierre.

**735 U G 3**  
**Advanced Corrosion**

W. 3 cl.  
 Prereq.: 635.  
 Theories and mechanisms of corrosion. Staehle.

**736 U G 3**  
**The Behavior of Materials at Elevated Temperatures**

Sp. 3 cl.  
 Prereq.: 330.  
 The mechanical and chemical properties of materials at elevated temperatures; creep, superalloys, dispersion strengthening, composites, and oxidation. Rapp.

**740 U G 3**  
**Theory and Properties of Metals**

A. 3 cl.  
 Prereq.: 551; Chem. 521 and Math. 415; or permission of instructor.  
 Dependence of physical properties on structure; regularities in the structure of alloy systems; stability of alloy system; transplant phenomena in metals and alloys; magnetic phenomena. Speiser.

**745 U G 3**  
**Advanced Physical Metallurgy I**

A. 3 cl.  
 Prereq.: 551.  
 Diffusion in metals. Powell.

**750 U G 3**  
**Advanced Physical Metallurgy II**

W. 3 cl.  
 Prereq.: 745.  
 Nucleation theory in phase transitions, formal nucleation and growth theory, recovery, recrystallization and grain growth, allotropic phase transitions, early stages of precipitation from solid solution. Meyrick.

**793 U G 2-6**  
**Individual Studies in Metallurgical Engineering**

Su, A, W, Sp.  
 Prereq.: Permission of instructor.  
 Repeatable to a maximum of 6 cr. hrs.

**794 U G 2-6**  
**Groups Studies in Metallurgical Engineering**

Su, A, W, Sp.  
 Prereq.: Permission of instructor.  
 Repeatable to a maximum of 6 cr. hrs.

**800 G 3**  
**Theoretical Metallurgy**

A. 3 cl.  
 Prereq.: Met. E. grad. standing or permission of instructor.  
 Repeatable to a maximum of 9 cr. hrs.  
 Current topics in the field of specialization of the Visiting Battelle Professor of Metallurgy.

**801 G 3**  
**Theoretical Metallurgy**

W. 3 cl.  
Prereq.: 800.  
Continuation of 800.  
Visiting Battelle Professor of Metallurgy.

**802 G 3**  
**Theoretical Metallurgy**

Sp. 3 cl.  
Prereq.: 801.  
Continuation of 801.  
Visiting Battelle Professor of Metallurgy.

**820 G 3**  
**Theory of Metal Refining**

Sp. 3 cl.  
Prereq.: 730.  
Mechanisms of reactions in liquid alloys; applications of thermodynamics and kinetics to the analysis of metal refining. St. Pierre.

**831 G 3**  
**Advanced Metallurgical Thermodynamics II**

W. 3 cl.  
Prereq.: 730.  
Continuation of 730; thermodynamics of metallurgical systems. Speiser.

**832 G 3**  
**Advanced Metallurgical Thermodynamics III**

A. 3 cl.  
Prereq.: 730.  
Continuation of 831; irreversible phenomena; metallurgical kinetics; application of rate theory to transport phenomena in metals and to metallurgical reactions. Rapp.

**835\* G 3**  
**Point Defects in Crystalline Materials**

W. 3 cl.  
Prereq.: 730 or permission of instructor.  
A thermodynamic and electrochemical treatment of the formation, concentrations, mobilities, and interactions of atomic, ionic, and electronic point defects in materials at high temperatures. Rapp.

**841 G 3**  
**Theory and Properties of Metals**

W. 3 cl.  
Prereq.: 740.  
Continuation of 740. Speiser.

**842 G 3**  
**Theory and Properties of Metals**

Sp. 3 cl.  
Prereq.: 841.  
Continuation of 841. Speiser.

**851 G 3**  
**Advanced Physical Metallurgy III**

Sp. 3 cl.  
Prereq.: 745 and 750.  
Classification of phase transformations, continuous and discontinuous precipitation from solid solution, eutectoidal transformations, massive and martensitic transformations, order-disorder changes. Meyrick.

**852 G 3**  
**Advanced Physical Metallurgy IV**

W. 3 cl.  
Prereq.: 851.  
Relation of properties to microstructure. Hirth.

**855 G 3**  
**Structures of Metals and Alloys**

Sp. 3 cl.  
Prereq.: 480, 551, and Math. 415; or permission of instructor.  
Application of X-ray diffraction and electron diffraction theory to the study of the structure of metals and alloys. Rigney.

**860 G 3**  
**Quantitative Dislocation Theory**

A. 3 cl.  
Prereq.: Math. 255 or permission of instructor.  
Mathematical treatment of dislocation theory and its application to flow and fracture phenomena in solids. Hirth.

**861 G 3**  
**Advanced Mechanical Metallurgy**

Sp. 3 cl.  
Prereq.: 560 or equiv.  
Mechanics of deformable bodies, advanced topics in elasticity, tensile deformation, mechanics of fracture, plastic instability and its role in notch ductility and fracture. Spretnak.

**881 G 1**  
**Graduate Seminar**

A, W, Sp.  
Repeatable to a maximum of 12 cr. hrs.  
Discussion of current thesis problems and outstanding current literature in metallurgical engineering; round table discussion of selected metallurgical topics.

**994 G 2**  
**Group Studies in Metallurgical Engineering**

Su, A, W, Sp. 2 cl.  
Prereq.: Permission of instructor.  
Repeatable to a maximum of 8 cr. hrs.  
Pertinent topics to be announced.

**999 G Arr.**  
**Research in Metallurgy**

Su, A, W, Sp.  
Research for thesis or dissertation purposes only.



# Microbiology

Office: 368 Biological Sciences Building, 484 West 12th Avenue

**Professors** Pfister (Chairman), Banwart, Birkeland (Emeritus), Bohl, Dodd, Dugan, Ferguson, Hudson (Emeritus), Kreier, Macpherson, Miller, Randles, Rheins, Rosen, Saslaw, Snell, Stahly (Emeritus), Wilson, Woolpert (Emeritus), and Yohn; **Associate Professors** Byers, Chorpennig, Copeland, Frea, Kolodziej, St. Pierre, Suie, and Wolff; **Assistant Professors** Krueger, Mote, and Sharp; **Adjunct Assistant Professor** Barker; **Instructor** Ackermann.

For related courses see Biology.

## 211† U 5

### General Microbiology

A. 3 cl., 6 lab. hrs.

Prereq.: Superior performance in biol., chem., and math. in high school and permission of instructor.

A special course for first year college students; morphologic and physiologic characteristics of microorganisms. Frea, Kolodziej, and Pfister.

## 212† U 5

### General Microbiology

W. 3 cl., 6 lab. hrs.

Prereq.: Superior performance in biol., chem., and math. in high school and permission of instructor.

A special course for first year college students; genetics and ecology of microorganisms. Frea, Dugan, and Randles.

## 301 U 2

### The Biology of Pollution

A. 2 cl.

Credit does not count toward a major in Microbiology.

A general consideration of the interactions of environmental pollutants and biological systems. Dugan.

## 509 U G 5

### Microbiology in Relation to Man

Su, A, W, Sp. 3 cl., 2 2-hr. labs.

Prereq.: Biol. 100 or equiv.; Biol. 101 recommended.

Not open to students with credit for 600-level courses in Microbiol.

Not to be taken concur. with Microbiol. 607.

Not for students who intend to take other courses in Microbiol.

Designed to give the student an understanding of microorganisms which have a bearing on the physical and economic well-being of man. Ackermann, Mote, and Randles.

## 592 U 2

### Independent Study of Practical Microbiology

Su, A, W, Sp.

Prereq.: 4th yr. microbiol. major and permission of coordinating adviser.

Students will work with course instructor, teaching assistants and associates to examine preparation and presentation of material, and gain experience working with students and faculty.

## GENERAL PREREQUISITES FOR COURSES NUMBERED 600 AND 700

Unless otherwise indicated the prerequisites for 600 and 700-level courses are 15 hours of chemistry and 10 hours of biological sciences.

## 605† U G 5

### Basic Microbiology for Science Teachers

Su. 3 cl., 3 2-hr. labs.

Prereq.: Biological science majors in the College of Education, or students in the Academic Year Institute, or grad. teachers of Biological Sciences.

Biology and physiology of bacteria; their applications to foods, soil, fertility, sanitation, and disease; laboratory exercises include those designed for limited equipment in high schools.

## 607 U G 5

### General Microbiology

A, W, Sp. 3 cl., 2 3-hr. lab.

Prereq.: 10 cr. hrs. in Biol. Sci. and 15 cr. hrs. in Chem.

May not be taken concur. with 509.

Fundamental principles of microbiology and of the characteristics of microorganisms emphasizing their morphology, classification, visualization, isolation, cultivation and maintenance, growth and death. Kolodziej and Kreier.

## 609 U G 5

### General Microbiology

A, W. 3 cl., 2 3-hr. labs.

Prereq.: 607.

Fundamental principles of microbiology emphasizing the physiology, ecology, and genetics of microorganisms. Copeland, Dugan, and Frea.

## 622 U G 5

### Principle of Infection and Resistance

W, Sp. 3 cl., 2 2-hr. labs.

Prereq.: 607 or equiv.

A study of host-parasite relationships, with emphasis on pathogenicity and immunity. Dodd.

## Medical Microbiology

(See Med. Micro. 624 and 625.)

## 624 U G 5

### Microbial Parasitism

A, Sp. 3 cl., 2 2-hr. labs.

Prereq.: 622.

Overview of parasitic relationships with emphasis on host response as influenced by route of contact, nature of etiologic agent(s), host species, and environmental influences. Rheins.

## 625† U G 5

### Pathogenesis and Immunology of Infectious Diseases

A, Sp. 3 cl., 2 2-hr. labs.

Prereq.: 622.

A consideration of the microbiological and immunological aspects of representative types of infectious diseases.

**627 P 6****Microbiology for Optometry Students**

Sp. 3 cl., 2 2-hr. labs.

Prereq.: Enrollment in the College of Optometry.

A specialized course in microbiology designed for professional students in Optometry which will deal with principles of infection, resistance, and related topics as they relate to the eye. Rheins.

**629 U G 4****Pathogenic Protozoology**

Sp. 3 cl., 1 2-hr. lab.

Prereq.: Permission of instructor.

Not open to students with credit for 729.

Pathogenic protozoa of animals are considered; emphasis on host-parasite relationships, pathogenesis of diseases, structural characteristics of parasites; ab, fresh, and preserved material. Kreier.

**632 U G 5****Cellular Aspects of the Immune Response**

A, Sp. 3 cl., 2 3-hr. labs.

Prereq.: 622 or equiv.

Cellular and molecular mechanisms of the immune response; characterization of cell products elaborated subsequent to antigenic stimulation; significance of these products in immunologic disease.

**634 U G 5****Water Microbiology**

W. 2 cl., 2 2-hr. labs.

Prereq. or concur.: 607, and Chem. 243 or equiv.

A basic study of the relationships and influence of aquatic environments on microorganisms and the effect of microbial metabolic processes on the quality of water. Dugan.

**636 U G 5****Food Microbiology**

A, Sp. 3 cl., 3 2-hr. labs.

Prereq.: 509, 607 or equiv.

The role of microorganisms in food preservation and processing with related sanitation and public health problems. Banwart.

**639†\* U G 4****Aquatic Microbiology**

Su (2nd term). 3 all-day cl. per wk.

Prereq.: 20 cr. hrs. of biological sciences, including Microbiol. 607 or equiv., and Chem. 243 or equiv.

Given only at the Franz Theodore Stone Laboratory.

The nature and activities of bacteria in the aquatic environment, with emphasis on the different physiological types found in the Lake Erie region. Randles.

**640 U G 5****General Cellular Biology**

A, W. 4 cl., 1 4-hr. lab.

Prereq.: 10 cr. hrs. in biol. sciences and Chem. 242 and 246 or equiv.

Not open to students with credit for Biol. 312 or 640.

A introduction to cell structure and function with emphasis on integration of cytological, biochemical, genetical, and developmental perspectives. Byers, Parrish, and Sharp.

**642 U G 5****Cell Differentiation**

Sp. 3 cl., 1 1-hr. rec.

Prereq.: 640 or equiv. or permission of instructor.

A study of cell differentiation including cyclic and non-cyclic change in macromolecules and organelles in cell populations. Sharp.

**652 P G 4****General and Pathogenic Microbiology for Dental Students**

W. 3 cl., 2 1-hr. labs.

Prereq.: Dent. 2nd yr. standing.

A survey of the principles of microbiology emphasizing sterilization, infectious processes and immunology. Chorpenning and Rosen.

**653 P G 3****Oral Microbiology**

W. 2 cl., 1 1-hr. lab.

Prereq.: 652 or permission of instructor.

A study of the oral flora and the oral diseases having a microbial etiology. Rosen.

**Soil Microbiology**

(See Agron. 660.)

**670 U G 5****Cytologic Preparations in Electron Microscopy**

A, W. 3 cl., 2 3-hr. labs.

Prereq.: 10 cr. hrs. in biological sciences and Chem. 264 or equiv. and permission of instructor.

Basic principles of electron microscopy, preparation, examination, and interpretation of biological specimens. Pfister.

**693 U G 1-5****Individual Studies in Microbiology**

Su, A, W, Sp.

Prereq.: Microbiol. 4th yr. major or grad. standing and permission of instructor.

No more than 5 cr. hrs. can be counted toward an undergraduate microbiol. major.

Repeatable only by undergraduates to a maximum of 15 cr. hrs.

Outlined by instructor to meet individual student's needs.

**694 U G 2-5****Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Group work on special topics in microbial or cellular biology.

**710† U G 3****History of Microbiology and Allied Fields**

Sp. Lects., confs., and library work.

Prereq.: Microbiol. advanced graduate standing and permission of instructor.

The historical development of bacteriology, immunology, and allied fields.

**723 U G 5****Immunology and Immunochemistry**

Su. 3 cl., 2 3-hr. labs.

Prereq.: 622 and permission of instructor.

A thorough treatment of the basic phenomena involving antigens and antibodies, their physico-chemical natures, and immunological reactions. Chorprenning.

**725†\* U G 5****Bacterial Pathogens**

W. 3 cl., 2 2-hr. labs.

Prereq.: 624.

Emphasis on the nature of representative bacterial disease agents. Rheins.

**736 U G 5****Advanced Food Microbiology**

W. 2 cl., 2 3-hr. labs.

Prereq.: 636 and permission of instructor.

Advanced studies of the microorganisms involved in the preservation and processing of food products using rapid analytical procedures. Banwart.

**749 U G 5****Basic Virology**

A, W. 3 cl., 2 3-hr. labs.

Prereq.: 609 and Biochem. or Physiol. Chem. and permission of instructor.

The basic physical, chemical, and biological properties of animal and bacterial viruses including intracellular replication and subcellular responses to virus infection. Wolff.

**760 U G 5****Physiology of Bacteria**

Sp. 3 cl., 2 3-hr. labs.

Prereq.: 609.

Nutritional requirements of bacteria, mechanisms of anaerobic dissimilation of carbon compounds, and industrial fermentation. Kolodziej and Randles.

**761†\* U G 5****Physiology of Bacteria**

Sp. 3 cl., 2 3-hr. labs.

Prereq.: 760.

Bacterial enzymes, mechanisms and energy relationships in respiration, nitrogen metabolism, and bacterial syntheses. Kolodziej.

**765† U G 5****Applied Microbiology**

A. 3 cl., 2 3-hr. labs.

Prereq.: 761 and permission of instructor.

A study of the metabolic activities of microorganisms exploited to produce useful chemical reactions or commercial products.

**770 U G 5****Microbial Cytology**

Sp. 3 cl., 2 3-hr. labs.

Prereq.: 609 and permission of instructor.

A thorough study of morphology, fine structure and composition of microorganisms, and the relation of these to cell function. Pfister.

**775 U G 4****Protozoan Growth and Reproduction**

Sp. 2 1½-hr. cl.

Prereq.: 640, Biochem. 511 or equiv., and permission of instructor.

A consideration of factors regulating the growth and multiplication of selected protozoans with emphases on the roles of environment and genome and on molecular mechanisms. Byers.

**780 U G 5****Microbial Genetics**

Sp. 3 cl., 2 3-hr. labs.

Prereq.: 609 and permission of instructor.

A thorough study of microbial genetics with emphasis on bacteria and viruses. Copeland.

**781 U G 5****Special Groups of Microorganisms**

Su. 3 cl., 2 3-hr. labs.

Prereq.: 609 and permission of instructor.

A study of the morphology, physiology, and ecology of "non-typical" bacteria, actinomycetes, myxobacteriales, spirochaetes, filamentous S bacteria, and others. Frea.

**H783 U 3-5****Honors Course**

Su, A, W, Sp.

Prereq.: 4th yr. standing with a grade of A in at least half of the courses in Microbiology and an average of B in the remainder; permission of instructor under whose supervision the work is to be completed and the Arts and Sciences Honors Committee.

At least 2 qtrs. are required of candidates for the degrees Bachelor of Science or Bachelor of Arts with **distinction** in Microbiology. Failure to receive a mark of S in this course is a disqualification for special honors.

Repeatable to a maximum of 15 cr. hrs.

A program of reading and research for each student with individual conferences, reports, and Honors thesis.

**799 U G 1****Microbiology Colloquium**

A, W, Sp. 1 cl.

Repeatable to a maximum of 15 cr. hrs.

**820†\* G 5****Advanced Virology**

Sp. 2 cl., 2 3-hr. labs.

Prereq.: 749 and permission of instructor.

Laboratory study of viruses and some of the virus diseases of animals and man; methods of isolation, propagation, identification, diagnosis, and control are considered. Wolff.

**822†\* G 3****Advanced Immunology**

Sp.

Prereq.: Permission of instructor.

Advanced studies of immunological phenomena, with emphasis on the physical and chemical aspects of antigens and antibodies. Dodd.

824†\* G 5

**Isoantigens of Man and Animals**

Sp. 3 cl., 2 2-hr. labs.

Prereq.: 723 or equiv. and permission of instructor.

Advanced genetic, chemical, and immunological studies of isoantigens, including those in erythrocytes, leukocytes, platelets, body fluids, and tissues; implications in transplantation and immunological diseases. Chorprenning.

860†\* G 5

**Advanced Topics in Bacterial Physiology**

A. 3 cl., 2 3-hr. labs.

Prereq.: 760 and permission of instructor.

Laboratory study of bacterial physiology by a variety of techniques. Dugan, Frea, and Randles.

880 G 1-3

**Seminar in Microbiology**

Su, A, W, Sp.

Repeatable by permission of instructor only.

890 G 2

**Interdepartmental Seminar in Developmental Biology**

A, W, Sp. 1 2-hr. cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 12 cr. hrs.

Students will present oral reports and lead discussion on research progress in specific areas of developmental biology.

891 G 2

**Interdepartmental Seminar in Environmental Biology**

Su, A, W, Sp. 1-2 hr. cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 24 cr. hrs.

Selected topics treating the environmental aspects of organisms, populations, and ecosystems as they may relate to time, space, and human activities.

896 G 1-3

**Interdepartmental Seminar in Polar and Alpine Studies**

Sp.

(See under Interdepartmental Seminars.)

897 G 1

**Interdepartmental Seminar in Natural Resources**

A, W, Sp.

Repeatable to a maximum of 9 cr. hrs. with permission of the dept. of enrollment.

(See under Interdepartmental Seminars.)

898 G 1

**Interdepartmental Seminar in Nutrition and Food Technology**

Sp.

(See under Interdepartmental Seminars.)

994 G 2-5

**Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Group work on special topics in microbial or cellular biology.

999 G Arr.

**Research in Microbiology**

Su, A, W, Sp.

Research for thesis or dissertation purposes only.

## Military Science

Office: 253 Military Science Building, 2121 Tuttle Park Place.

Army Reserve Officers Training Corps.

**Professor** Col. Cuta (Chairman); **Assistant Professors** Lt. Stephens, Maj. O'Hagan, Maj. Kelly, Cpt. Bonnell, Cpt. Cheatham, Cpt. Harrison, Cpt. McWherter.

Basic Military Science

111 U 2

**U. S. Defense Establishment and National Security**

A. 2 1-hr. cl., 1 lab.

Nature of war, power, national security; proper functions of armed forces; evolution of military professionalism; missions and organization of U. S. Defense Establishment; collective security arrangements.

112 U 2

**Development of Basic Weaponry**

W. 1 2-hr. cl., 1 lab.

Prereq.: 111, or permission of Prof. of Mil. Sc.

Examination and application of fundamentals of weaponry and marksmanship, including: evolution of the rifle; mechanics and functioning of standard military rifles and .22 calibre target rifle; weapons safety.

113 U 2

**Map Reading**

Sp. 2 1-hr. cl., 1 lab.

Interpretation of topographic maps, emphasizing terrain evaluation, including: symbology, grid and polar coordinates, elevation and relief, scale and distance, azimuth, intersection, resection, and aerial photographs.

211 U 2

**History of the Military Art I**

A. 1 2-hr. cl., 1 lab.

Prereq.: Completion of 111, 112, and 113.

Introduction to development of tactics and strategy, development of military art/science from ancient times until post-Napoleonic era; illustrated by selected campaigns and battles.

## 212 U 2

### History of the Military Art II

W. 2 1-hr. cl., 1 lab.

Prereq.: 211, or permission of Prof. of Mil. Sci.

Development of U.S. military professionalism; military history from 1845 to 1939 with special emphasis on organization, tactics, technology, campaigns, battles, and commanders of the U.S. Army.

## 213 U 2

### History of the Military Art III

Sp. 2 1-hr. cl., 1 lab.

Prereq.: 212 or permission of Prof. of Mil. Sci.

Recent military history, strategy, and tactics, with special emphasis on developments, campaigns, battles, and commanders of U. S. Army since WW II.

## Advanced Military Science

## 301 U 3

### Military Leadership Case Studies

A. 2 2-hr. cl., 1 hr. leadership lab.

Prereq.: 101 through 203 or equiv.

Study of behavioral patterns and managerial methods applied to the military environment.

## 302 U 3

### Small Unit Tactics

Su, W. 2 2-hr. cl., 1 hr. leadership lab.

Prereq.: 203 and 301 or permission of Professor of Mil. Sc.

Organization, mission, characteristics, and capabilities of the infantry squad, platoon, company, and battalion; review of rifle squad and weapons squad tactics; study of platoon tactics, troop leading procedures; preparation of estimates and orders; company tactics to include attack, defense, and retrograde operations; infantry tank-team techniques; leadership laboratory.

## 303 U 3

### Principles of Military Teaching

Sp. 2 2-hr. cl., 1 hr. leadership lab.

Prereq.: 302 or permission of Professor of Mil. Sc.

An introduction to the branches of the Army and study of fundamentals of instruction in the military educational environment.

## 401 U 3

### Military Operations

Su, A. 2 2-hr. cl., 1 hr. leadership lab.

Prereq.: 303 or permission of Professor of Mil. Sc.

The study of Army organizations and operations to include managerial aspects of command and staff; emphasizes support of combat operations in various environmental situations; guest speakers program sponsored by National Strategy Information Center, Subject: World Change and Military Implications; leadership laboratory.

## 402 U 3

### Logistics and Administration

W. 2 2-hr. cl., 1 hr. leadership lab.

Prereq.: 401 or permission of Professor of Mil. Sc.

Study of logistics to include management of combat and garrison supply, equipment maintenance, transportation and troop movement; training management to include staff scheduling principles and the design and execution of training exercises; Army administration to include medical services, military publications, standard forms, and the supervision of administrative requirements; guest speaker program sponsored by National Strategy Information Center, Subject: World Change and Military Implications; leadership laboratory.

## 403 U 3

### Military Justice and Preparation for Service

Sp. 2 2-hr. cl., 1 hr. leadership lab.

Prereq.: 402 or permission of Professor of Mil. Sc.

Study of military justice; review of map reading; civic action, internal defense and development of Southeast Asian nations; and service orientation.

## Mineralogy

(See courses in Geology and Mineralogy.)

## Music

Office: 105 Hughes Hall, 1899 College Road

**Professors** Luce (Director), Barnes, Cady, Haddad, Hardesty, Held, Hoppin, Kuehefuhs, Livingston, Main, McGinnis, Phelps, Poland, Ramsey, Staiger (Visiting), Tetley-Kardos, and Tolbert; **Associate Professors** Barnes, Casey, Cooper, Hickfang, Hightshoe, Huff, Kimber, Mathis, McClure, Meeker, Mixter, Muschick, Sexton, Titus, Vedder, and Wilson; **Assistant Professors** Alch, Baker, Barber, Battenberg, Bonney, Burkart, Cooper, Conable, Costanza, Culver, Droste, Fligel, Gano, Green, Jakovljevic, Jones LeBlanc, Levey, Lowder, Maas, Moore, Platt, Ramsier, Swank, Thompson, Whallon, Wink, and Zimmerman; **Instructors** Harriman, Hurn, Magg, Price, Sedoris, Sentieri, Stevens, Tice, Turley, and Von Gruenigen.

Preceding the class sessions of Music 221 and Music 201, placement tests will be given to determine the ability of students in these subjects. (See School of Music for details of time and place.)

## 100 U 1

### Concert Attendance

A, W, Sp. Attendance at 9 concerts or recitals.

Prereq.: Attendance at 45 concerts and recitals.

## 141 U 5

### Introduction to Music

Su, A, W, Sp. 3 cl., 2 hrs. arr.

Not for credit to Mus. majors.

A musical background is not required.

A consideration of the materials of music and important styles, forms, and composers from the Baroque to the present. Gano.

**142 U 3**  
**Introduction to the History of Western Music I**

A, W, Sp. 3 cl.

Prereq.: 141.

Not for credit to Mus. majors.

An historical survey of music from classical antiquity to about 1750.

**143 U 3**  
**Introduction to the History of Western Music II**

Su, A, W, Sp. 3 cl.

Prereq.: 141.

Not for credit to Mus. majors.

An historical survey of music from 1750 to the present.

**CAMPUS MUSIC ORGANIZATIONS**

University Campus Music Organizations are open to all students in the University who may receive full credit according to regulations of the college in which they are enrolled.

**160 U 5**  
**The Arts in Contemporary America**

A, W, Sp. 4 cl., 1 lab. hr.

(Cross-listed in the Div. of Art Education and the Dept. of Dance.)

A study of the role of the arts in American society based on live, recorded, and filmed performances and exhibitions.

**180 U 1**  
**University Chorus**

Su (1st term), A, W, Sp. 3 or more hrs. rehearsal each week.

Prereq.: Admission by audition only.

Repeatable to a maximum of 12 cr. hrs.

Oratorio and large choral works are studied and performed. Casey.

**181 U 2**  
**Symphonic Choir**

A, W, Sp. 6 or more hrs. rehearsal each week.

Prereq.: Admission by audition only.

Repeatable to a maximum of 24 cr. hrs.

Symphonic Choir is a concert organization singing a variety of literature. Casey.

**182 U 1**  
**Women's Glee Club**

A, W, Sp. 3 or more hrs. rehearsal each week.

Prereq.: Auditions are held at stated periods, and vacancies in the club are filled with the best available voices. Admission by audition and permission of director.

Repeatable to a maximum of 12 cr. hrs.

[Membership in this concert group is open to all women students in the University by audition.]

Study and performance of choral literature for women's voices. Turley.

**183 U 1**  
**Men's Glee Club**

A, W, Sp. 3 or more hrs. rehearsal each week.

Prereq.: Auditions are held at stated periods, and vacancies in the club are filled with the best available voices. Admission by audition and permission of director.

Repeatable to a maximum of 12 cr. hrs.

[Membership in this concert group is open to all men students in the University by audition only.]  
 Study and performance of choral literature for men's voices. Staiger.

**184 U 2**  
**University Symphony Orchestra**

Su (1st term), A, W, Sp. 6 or more hrs. rehearsal each week.

Prereq.: Admission by audition and permission of director.

Repeatable to a maximum of 24 cr. hrs.

[Membership is open to all University students by audition.]

The University Orchestra is an 85-piece orchestra of full instrumentation devoted to the preparation of standard and modern literature; the group gives at least three concerts each year. Gerle.

**185 U 1**  
**Chamber Orchestra**

A, W, Sp. 3 or more hrs. rehearsal each week.

Prereq.: Admission by audition.

Repeatable to a maximum of 12 cr. hrs.

A selected group giving public and broadcast performances; professional orchestral techniques are emphasized.

**186 U 2**  
**University Football Marching Band**

A. 6 or more hrs. rehearsal each week.

Prereq.: Admission by audition and permission of director.

Repeatable to a maximum of 12 cr. hrs.

The University Marching Band is a selected group of brass and percussion players which performs at football games and rallies during Autumn Quarter. Droste.

**187 U 1**  
**ROTC Band (Air-Army)**

W, Sp. 3 or more hrs. rehearsal each week.

Prereq.: Admission by audition and permission of director.

Open to men and women students.

Repeatable to a maximum of 10 cr. hrs.

Droste.

**188 U 2**  
**The University Concert Band**

A, W, Sp. 6 or more hrs. rehearsal each week.

Prereq.: Admission by audition and permission of director.

Repeatable to a maximum of 24 cr. hrs.

A selected group of limited membership devoted to the preparation and performance of the best band literature; gives public concerts and performs for University functions. McGinnis.

**189 U 1**  
**The University Buckeye Bands**

Su (1st term), A, W, Sp. 3 or more hrs. rehearsal each week.

Prereq.: Admission by audition and permission of director.

Repeatable to a maximum of 12 cr. hrs.

Provide concert band participation for students not enrolled in the University Concert Band; perform for University functions and give public concerts. Droste, Le Blanc, and Meeker.

**190† U 1****Opera Chorus**

Su (1st term), A, W, Sp. 2 or more hrs. rehearsal each wk.

Prereq.: Admission by audition and permission of instructor.

Not open to juniors and seniors in opera program.

Repeatable to a maximum of 12 cr. hrs.

Hickfang.

**191 U 2****Chorale**

A, W, Sp. 6 or more hrs. rehearsal each week.

Prereq.: Admission by audition and permission of instructor.

Repeatable to a maximum of 24 cr. hrs.

A selected group of mixed voices which performs an extensive repertoire in concerts both on and off campus. Casey.

**194 U 1****Brass Choir**

A, W, Sp. 2 or more hrs. rehearsal each week.

Prereq.: Admission by audition and permission of instructor.

Repeatable to a maximum of 12 cr. hrs.

A selected group of brass and percussion students which gives public performances both on and off campus. Burkart.

**195 U 1****University Percussion Ensemble**

A, W, Sp. 2 or more hrs. rehearsal each wk.

Prereq.: Permission of instructor.

Repeatable to a maximum of 12 cr. hrs.

A laboratory and performance musical ensemble whose literature consists of original and transcribed works for percussion instruments alone or with percussion as a dominant feature. Moore.

**196 U 1****Jazz Ensembles**

A, W, Sp. 2 or more hrs. rehearsal each wk.

Prereq.: Permission of instructor.

Repeatable to a maximum of 12 cr. hrs.

A selected group devoted to playing, arranging, and rehearsing contemporary jazz and stage band literature. Battenberg.

**197 U 1****Music Education Laboratory Ensemble**

A, W, Sp. 2 or more hrs. rehearsal each wk.

Prereq.: Permission of instructor.

Repeatable to a maximum of 3 cr. hrs.

Laboratory ensembles which provide performance experience on secondary instruments.

**199 U 1****Small Ensembles**

Su, A, W, Sp. 2 or more hrs. rehearsal each week.

Prereq.: Admission by audition and permission of instructor.

Each decimal subdivision repeatable to a maximum of 12 cr. hrs.

**199.01 Piano**

**199.02 Voice**

**199.03 Strings**

**199.04 Woodwinds**

**199.05 Brass**

**199.06 Organ**

**199.07 Percussion**

**199.08 Harpsichord**

**199.09 Harp**

**199.10 Miscellaneous**

**200 U 1-2****Applied Music (Secondary)**

Su, A, W, Sp. 1 1/2-hr. lesson, studio classes and recital attendance arr.

Prereq.: Music major or permission of the Director of the School of Music.

Repeatable to a maximum of 12 cr. hrs. for each decimal subdivision.

Fundamental applied music instruction in areas other than a student's major or principal area.

**200.01 Piano**

Su, A, W, Sp.

**200.02 Voice**

Su, A, W, Sp.

**200.03 Strings**

Su (1st term), A, W, Sp.

**200.04 Woodwinds**

Su (1st term), A, W, Sp.

**200.05 Brass**

Su (1st term), A, W, Sp.

**200.06 Organ**

Su (1st term), A, W, Sp.

**200.07 Percussion**

A, W, Sp.

**200.08† Harpsichord**

A, W, Sp.

**200.09 Harp**

A, W, Sp.

**201 U 1-2****Applied Music (Principal)**

1 1-hr. lesson, studio classes and recital attendance arr.

Prereq.: Passing of placement test.

Required of students in all music curricula to a minimum of 6 qtr. hrs.

Open to other qualified students within the limits of instructional facilities by permission of Director of the School of Music.

Repeatable to a maximum of 10 cr. hrs. for each decimal subdivision.

Instruction in applied music to develop musicianship, performance, and a wide reading knowledge of music literature.

**201.01 Piano**

Su, A, W, Sp.

Haddad, Mathis, Mooney, Tetley-Kardos, and Platt.

**201.02 Voice**

Su, A, W, Sp.

Alch, Cooper, Hickfang, Kiesgen, Meier, and Muschick.

**201.03 Strings**

Su (1st term), A, W, Sp.

Conable, Culver, Kimber, Hardesty, and McClure.

**201.04 Woodwinds**

Su (1st term), A, W, Sp.

Baker, Fligel, Green, Magg, McGinnis, and Titus.

**201.05 Brass**

Su (1st term), A, W, Sp.

Battenberg, Burkart, Droste, Jones, and Le Blanc.

**201.06 Organ**

Su (1st term), A, W, Sp.

Held, Wilson, and Rigsby.

**201.07 Percussion**

A, W, Sp.

Moore.

**201.08† Harpsichord**

A, W, Sp.

**201.09 Harp**

A, W, Sp.

Harriman.

**212 U 2****Diction for Singers (Italian)**

A. 3 cl.

Prereq.: Minimum of 6 cr. hrs. of applied study in voice or permission of instructor.

Fundamentals of phonetics and sound production as applied to singing in Italian. Alch.

**213 U 2****Diction for Singers (German)**

W. 3 cl.

Prereq.: Minimum of 6 cr. hrs. of applied study in voice or permission of instructor, and 212.

Fundamentals of phonetics and sound production as applied to singing in German. Cooper.

**214 U 2****Diction for Singers (French)**

Sp. 3 cl.

Prereq.: Minimum of 6 cr. hrs. of applied voice or permission of instructor, and 212.

Fundamentals of phonetics and sound production as applied to singing in French. Muschick.

**221 U 3****Music Theory I**

A, W. 3 cl.

Prereq.: Passing of placement tests.

Detailed study of basic theoretical concepts, the elements of music, and musical notation, including elementary written and keyboard harmony, melody writing, analysis, and creative work.

**222 U 3****Music Theory II**

W, Sp. 3 cl.

Prereq.: 221.

Study of the principles of diatonic harmony, non-chordal tones, and secondary dominants, including two, three, and four-part writing, analysis, keyboard harmony, and creative work.

**223 U 3****Music Theory III**

Su, Sp. 3 cl.

Prereq.: 222.

A survey of chromatic harmony, seventh and ninth chords and modulation, with continuing emphasis on written and keyboard application, analysis, and original composition.

**224 U 1****Sight Singing and Dictation I**

A, W. 3 lab. hrs.

Singing and writing of major and minor scales, intervals, triads, tonal and rhythmic groups, tonal melodies, and canons.

**225 U 1****Sight Singing and Dictation II**

W, Sp. 3 lab. hrs.

Prereq.: 224.

Singing and writing of chromatic scales, seventh-chord outlines, tonal and rhythmic groups, more difficult tonal melodies, and two-part work.

**226 U 1****Sight Singing and Dictation III**

Su, Sp. 3 lab. hrs.

Prereq.: 225.

Singing and writing of synthetic scales, seventh and ninth chord outlines, tonal melodies and harmonic progressions with modulations, syncopated rhythmic figures, and two-part work.

**241 U 3****Music History I**

A. 3 cl., 2 lab. hrs.

Prereq.: 223.

The development of music from the earliest times through the sixteenth century. Maas.

**242 U 3****Music History II**

W. 3 cl., 2 lab. hrs.

Prereq.: 241.

The development of music in the 17th and 18th centuries. Maas.

**243 U 3****Music History III**

Sp. 3 cl., 2 lab. hrs.

Prereq.: 242.

The development of music in the 19th and 20th centuries. Maas.

**244 U 3****Survey of African and African-Derived Music in the Western World**

A, Sp. 3 cl.

Not open to students with credit for Black Studies 244. (Cross-listed in the Black Studies Division.)

An introduction to traditional African music and its role in the history and development of Afro-American music with its concomitant socio-political milieu. Barber.



**261 U 1 or 2****Applied Music Methods and Materials I****261.01 Piano**

A, W, Sp. 4 cl.  
Lowder.

**261.02 Voice**

A, W, Sp. 4 cl.  
Swank.

**261.03 Strings**

A. 4 cl.  
Culver.

**261.04 Woodwinds**

A, W. 4 cl.  
Von Gruenigen.

**261.05 Brass**

W. 4 cl.

**261.07 Percussion**

A, W, Sp. 4 cl.  
Moore.

**262 U 2****Applied Music Methods and Materials II**

Prereq.: 261 or equiv.

**262.01 Piano**

A, W, Sp. 4 cl.

**262.02 Voice**

W, Sp. 4 cl.

**262.03 Strings**

W. 4 cl.

**262.04 Woodwinds**

W, Sp. 4 cl.

**262.05 Brass**

Sp. 4 cl.

**263 U 2****Applied Music Methods and Materials III**

Prereq.: 262 or equiv.

**263.01 Piano**

W, Sp. 4 cl.

**263.02 Voice**

Sp. 4 cl.

**264 U 2****Applied Music Methods and Materials IV**

Prereq.: 263 or equiv.

**264.01 Piano**

A, Sp. 4 cl.

**264.02 Voice**

A. 4 cl.

**265 U 2****Music for Group Recreation**

A, Sp. 3 cl.

Preparation and participation in folk singing and dancing; experience in group leadership designed for recreation and camp leaders, social workers, teachers of music, and classroom teachers. Sexton.

**270 U 3****Basic Experiences in Music: Fundamentals**

Su, A, W, Sp. 5 cl.

Ear-training, music reading, creative writing, voice production, and some instrumental experience as applied to the music program in the elementary school. Sexton.

**271 U 2****Basic Experiences in Music: Literature and Listening**

Su, A, W, Sp. 4 cl.

The elements involved in active, intelligent listening, understanding, and appreciation of representative works of music as applied to the music program in the elementary school. Sexton and Turley.

**290 U 2****Introduction to Music Teaching**

A, W. 2 cl.

The initial course of the program leading to the Bachelor of Music Education degree; school experiences in music teaching and career guidance are provided.

**312 U 2****Opera Performance**

A, W, Sp. 4 lab. hrs.

Prereq.: Junior or senior standing and permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

Instruction and experience in preparation for open performance, including study of operatic literature and coaching of operatic roles. Hickfang.

**370 U 3****Music for Elementary Teachers**

Su, A, W, Sp. 5 cl.

Prereq.: 270, 271, and professional standing.

Music literature and teaching aids for children, including singing, rhythmic, creative, and listening experiences, and their presentation. Sexton, Bonney, and Thompson.

**401 U 1-2****Applied Music (Principal)**

1 1-hr. lesson, studio classes and recital attendance arr.

Prereq.: 201 and permission of applied area faculty.

Open to other qualified students within the limits of instructional facilities by permission of the Director of the School of Music.

Repeatable to a maximum of 8 cr. hrs. for each decimal subdivision.

Applied music instruction required in the B.M.E. curriculum to develop musicianship, performance, and a wide reading knowledge of music literature.

**401.01 Piano**

Su, A, W, Sp.

**401.02 Voice**

Su, A, W, Sp.

**401.03 Strings**

Su (1st term), A, W, Sp.

**401.04 Woodwinds**

Su (1st term), A, W, Sp.

**401.05 Brass**

Su (1st term), A, W, Sp.

**401.06 Organ**  
Su (1st term), A, W, Sp.

**401.07 Percussion**  
A, W, Sp.

**401.08† Harpsichord**  
A, W, Sp.

**401.09 Harp**  
A, W, Sp.

#### 402 U 2 or 4

##### Applied Music (Major)

1 1-hr. lesson, studio classes and recital attendance arr.  
Prereq.: 201 and permission of applied area faculty.  
Repeatable to a maximum of 16 cr. hrs. for each decimal subdivision.

Instruction required in B.M. curricula in performance to develop professional qualities of musicianship, technique, and knowledge of music literature.

**402.01 Piano**  
Su, A, W, Sp.

**402.02 Voice**  
Su, A, W, Sp.

**402.03 Strings**  
Su (1st term), A, W, Sp.

**402.04 Woodwinds**  
Su (1st term), A, W, Sp.

**402.05 Brass**  
Su (1st term), A, W, Sp.

**402.06 Organ**  
Su (1st term), A, W, Sp.

**402.07 Percussion**  
A, W, Sp.

**402.08† Harpsichord**  
A, W, Sp.

**402.09 Harp**  
A, W, Sp.

#### 421 U 3

##### Music Theory IV

A. 3 cl.

Prereq.: 223.

Critical study of chromatic harmony of the 18th and 19th centuries including modulatory methods and devices; current musical practice and relationships to traditional composition.

#### 422 U 3

##### Music Theory V

W. 3 cl.

Prereq.: 421.

Techniques of impressionism, and investigation of 20th century analytical methods for tonal music, and an introduction to twelve-tone compositional methods.

#### 423 U 3

##### Music Theory VI

Sp. 3 cl.

Prereq.: 422.

Analytical study of recent compositional techniques and devices and investigation of serial, aleatory, and electronic practices; creative work in contemporary styles.

#### 424 U 2

##### Ear-Training I

A. 4 lab. hrs.

Prereq.: 226.

Sight-singing, dictation, and keyboard harmony.

#### 425 U 2

##### Ear-Training II

W. 4 lab. hrs.

Prereq.: 424.

Intermediate sight-singing, dictation, and keyboard harmony.

#### 426 U 2

##### Ear-Training III

Sp. 4 lab. hrs.

Prereq.: 425.

Advanced sight-singing, dictation, and keyboard harmony.

#### 427 U 2

##### Keyboard Harmony I

A. 2 cl.

Prereq.: 261.01, 262.01, and 263.01 (6 cr. hrs.), 201.01 (6 cr. hrs.), or equiv.

Systematic review and utilization of basic harmonic materials at the keyboard.

#### 428 U 2

##### Keyboard Harmony II

W. 2 cl.

Prereq.: 427.

An introduction to score reading at the keyboard.

#### 429 U 2

##### Keyboard Harmony III

Sp. 2 cl.

Prereq.: 428.

Score reading at the keyboard.

#### 501 U 1-2

##### Applied Music (Principal)

1 1-hr. lesson, studio classes arr.

Prereq.: 401 and permission of applied area faculty.

Open to other qualified students within the limits of instructional facilities by permission of the Director of School of Music.

Repeatable to a maximum of 8 cr. hrs. for each decimal subdivision.

Applied music instruction required in the B.M.E. curriculum to develop musicianship, performance, and a wide reading knowledge of music literature.

**501.01 Piano**

Su, A, W, Sp.

**501.02 Voice**

Su, A, W, Sp.

**501.03 Strings**

Su (1st term), A, W, Sp.

**501.04 Woodwinds**

Su (1st term), A, W, Sp.

**501.05 Brass**

Su (1st term), A, W, Sp.

**501.06 Organ**

Su (1st term), A, W, Sp.

**501.07 Percussion**

A, W, Sp.

**501.08† Harpsichord**

A, W, Sp.

**501.09 Harp**

A, W, Sp.

**502 U 2 or 4****Applied Music (Major)**

1 1-hr. lesson, studio classes and recital attendance arr.

Prereq.: 402 and permission of applied area faculty.

Repeatable to a maximum of 16 cr. hrs. for each decimal subdivision.

Instruction required in B.M. curricula in performance to develop professional qualities of musicianship, technique, and knowledge of music literature; half recital required in junior year.

**502.01 Piano**

Su, A, W, Sp.

**502.02 Voice**

Su, A, W, Sp.

**502.03 Strings**

Su (1st term), A, W, Sp.

**502.04 Woodwinds**

Su (1st term), A, W, Sp.

**502.05 Brass**

Su (1st term), A, W, Sp.

**502.06 Organ**

Su (1st term), A, W, Sp.

**502.07 Percussion**

A, W, Sp.

**502.08† Harpsichord**

A, W, Sp.

**502.09 Harp**

A, W, Sp.

**511 U 2****Jazz Improvisation**

A. 2 cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 4 cr. hrs.

Analytical techniques for listening, melodic elaboration techniques, and techniques for creating new melodies with regard to relevant styles, phrasing, coherence, and current trends. Levey.

**521 U 3****Form and Analysis**

Su, A. 3 cl.

Prereq.: 423.

Introduction to the study of the formal structure of music.

**524 U 3****Instrumentation**

W, Sp. 3 cl.

Prereq.: 423.

An elementary course in scoring for the instruments of the orchestra and the band. McClure.

**531 U 3****Counterpoint**

A. 3 cl.

Prereq.: 423.

A fundamental course in counterpoint including species counterpoint, double counterpoint, imitation, and two-voice canon.

**535 U 3****Composition**

W, Sp. 3 cl.

Prereq.: 423.

Creative writing in the small forms.

**560 U 3****Beginning Conducting**

A, W. 3 cl.

Prereq.: 421.

The basic technique of the baton; a syllabus of selected literature and reading assignments will be used as a basis for study. Hardesty and Barber.

**570 U 3****General Music in Elementary Schools: Basic Teaching Practices**

A, W. 3 cl.

Prereq.: Enrollment in the College of Education.

Not open to students with credit for 561.

A study of the role of the music teacher in planning musical experiences for children with emphasis on child-development and appropriate teaching practices.

**571 U 3****General Music in Elementary Schools: Music Literature for Children**

Sp. 3 cl.

Prereq.: Enrollment in the College of Education.

Not open to students with credit for 561.

Study and analysis of art, folk, ethnic, and popular music literature suitable for children in elementary schools.

**572 U 3****General Music in Secondary Schools: Middle and Junior High School General Music**

A. 3 cl.

Prereq.: Enrollment in the College of Education.

Not open to students with credit for 562.

The role of music in adolescents' general education and the development of competencies essential to teaching.

**573 U 3****General Music in Secondary Schools: Organization and Teaching of High School Music Courses**

W. 3 cl.

Prereq.: Enrollment in the College of Education and completion of University Basic Education Requirements in the humanities and social sciences.

Not open to students with credit for 562.

Organization and teaching of courses (a) relating music to other arts or humanities and (b) dealing with the theory, history, or appreciation of music.

**574 U 3****Choral Music in the Schools:  
Basic Teaching Practices**

W, 2 cl., 2 lab. hrs.

Prereq.: Enrollment in the College of Education.

Not open to students with credit for 564.

Factors relating to organizing and teaching choral music in elementary, middle, and junior high schools.

**575 U 3****Choral Music in Senior High Schools**

Sp, 2 cl., 2 lab. hrs.

Prereq.: Enrollment in the College of Education.

Not open to students with credit for 564.

Rehearsal procedures, choral techniques, materials, and literature suited to various choral organizations of senior high schools.

**576 U 3****Instrumental Music in Elementary Schools**

A, Sp, 3 cl., 1 1-hr. lab.

Prereq.: 6 cr. hrs. in Music 261.03, 261.04, 261.05, or 261.07 and enrollment in the College of Education.

Not open to students with credit for 563.

The role of instrumental music instruction in public education, techniques of teaching instrumental music, study of music appropriate to musical organizations in elementary schools.

**577 U 3****Instrumental Music in Secondary Schools**

A, W, 3 cl., 1 1-hr. lab.

Prereq.: Enrollment in the College of Education.

Not open to students with credit for 563.

The role of instrumental music instruction in public education, techniques of teaching instrumental music, study of music appropriate to musical organizations in secondary schools.

**578 U 3****The Music Education Curriculum**

W, Sp, 3 cl.

Prereq.: Enrollment in the College of Education.

A study of the musical and learning processes involved in the music education curriculum from kindergarten through high school.

**586 U 3-8****Student Teaching in Music  
in Elementary Schools**

A, W, Sp.

Repeatable to a maximum of 8 cr. hrs.

Assignment to area elementary schools for observation and teaching experiences with groups of students and cooperating teachers; students attend weekly seminars with University supervisors.

**587 U 3-8****Student Teaching in Music  
in Secondary Schools**

A, W, Sp.

Repeatable to a maximum of 8 cr. hrs.

Assignment to area secondary schools for observation and teaching experiences with groups of students and cooperating teachers; students attend weekly seminars with University supervisors.

**593 U G 1-5****Individual Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 9 cr. hrs.

Individual studies in specified problems in the field of music.

**594 U 1-5****Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 9 cr. hrs.

Supervised group studies of special problems.

**601 U 1-2****Applied Music (Principal)**

1 1-hr. lesson, studio classes arr.

Prereq.: 501 and permission of applied area faculty.

Open to other qualified students within the limits of instructional facilities by permission of Director of School of Music.

Repeatable to a maximum of 8 cr. hrs. for each decimal subdivision.

Elective applied music instruction at the senior level for students in the B.M.E. curriculum; continuation of study of literature, technique, and musicianship.

**601.01 Piano**

Su, A, W, Sp.

**601.02 Voice**

Su, A, W, Sp.

**601.03 Strings**

Su (1st term), A, W, Sp.

**601.04 Woodwinds**

Su (1st term), A, W, Sp.

**601.05 Brass**

Su (1st term), A, W, Sp.

**601.06 Organ**

Su (1st term), A, W, Sp.

**601.07 Percussion**

A, W, Sp.

**601.08† Harpsichord**

A, W, Sp.

**601.09 Harp**

A, W, Sp.

**602 U 3 or 6****Applied Music (Major)**

1 1-hr. lesson, studio classes arr.

Prereq.: 502 and permission of applied area faculty.

Repeatable to a maximum of 18 cr. hrs. for each decimal subdivision.

Applied music instruction required in BM curricula in performance to develop professional qualities of musicianship; full recital required in senior year.

**602.01 Piano**

Su, A, W, Sp.

**602.02 Voice**

Su, A, W, Sp.

**602.03 Strings**

Su (1st term), A, W, Sp.

**602.04 Woodwinds**  
Su (1st term), A, W, Sp.

**602.05 Brass**  
Su (1st term), A, W, Sp.

**602.06 Organ**  
Su (1st term), A, W, Sp.

**602.07 Percussion**  
A, W, Sp.

**602.08† Harpsichord**  
A, W, Sp.

**602.09 Harp**  
A, W, Sp.

**611 U 3**  
**Introduction to Piano Pedagogy**

Sp. 3 cl.  
Prereq.: 6 cr. hrs. in 501.01 or permission of instructor.  
A critical analysis of various methods and principles of piano instruction, and of literature for the beginning and intermediate performer.

**612 U G 3**  
**Piano Pedagogy: Group Instruction**

Su (1st term), A. 3 cl.  
Prereq.: 6 cr. hrs. in 501.01 or permission of instructor.  
Concepts of group piano instruction, techniques for development of keyboard musicianship, and knowledge of appropriate literature and materials. Lower.

**613† U G 3**  
**Piano Pedagogy: Practicum**

Su, A, W, Sp. 3 cl.  
Prereq.: 611 or 612 or permission of instructor.  
Repeatable to a maximum of 6 cr. hrs.  
To provide supervised experience in piano instruction and guidance in the development of sequences of instruction and in the treatment of specific teaching problems.

**615 U G 3**  
**Structure and Function of the Singing Mechanism**

Su, W. 3 cl.  
Prereq.: Permission of instructor.  
The structure and function of the singing and breathing mechanisms as they relate to developmental teaching of voice in the formative years.

**621\* U G 3**  
**Analysis: The Classic Period**

Su, W. 3 cl.  
Prereq.: 521 or 243.  
An analytical study of representative works from Classic literature.

**622†\* U G 3**  
**Analysis: The Romantic Period**

Su, W. 3 cl.  
Prereq.: 521 and 243.  
An analytical study of representative works from Romantic literature. Barnes and Vedder.

**624\* U G 3**  
**Band Scoring**

A. 3 cl.  
Prereq.: 524.  
Scoring for the concert band.

**625†\* U G 3**  
**Orchestra Scoring**

A. 3 cl.  
Prereq.: 524.  
Scoring for the orchestra.

**627 U G 3**  
**Advanced Keyboard Harmony**

Su (1st term), A. 3 cl.  
Prereq.: 423.  
Practice in harmonizing melodies, realizing figured bass, improvisation, and modulation at the keyboard.

**631 U G 3**  
**Counterpoint I**

W. 3 cl.  
Prereq.: 531.  
Studies in imitation and invertible counterpoint, applied in the writing of two- and three-part inventions.

**633 U G 3**  
**Gregorian Chant**

A. 3 cl.  
A study of the historical background and characteristics of plain-song, including the technical aspects of notation, modes, rhythm, and chironomy. Kuehefuhs.

**634 U G 3**  
**Modal Counterpoint I**

W. 3 cl.  
Prereq.: 243 and 521.  
Counterpoint based on the vocal polyphonic style of the 16th century; analysis of representative works and practice in motet writing. Kuehefuhs.

**635 U G 3-5**  
**Composition**

Su, A, W, Sp. 3 cl.  
Prereq.: 535.  
Repeatable to a maximum of 9 cr. hrs.  
Creative writing; analysis, discussion, employment of devices used in contemporary music. Barnes, Huff, and Levey.

**636 U G 3**  
**Musical Uses of Electronic Devices**

A. 3 cl.  
Prereq.: Permission of instructor.  
Characteristics and uses of electronic devices for compositional, analytic, and experimental purposes in music.

**637 U G 3**  
**Electronic Composition**

A, W, Sp. 3 cl.  
Prereq.: 535 and 636.  
Repeatable to a maximum of 6 cr. hrs.  
Creative writing employing electronic sound sources. Ramsier.

**640\* U G 3**  
**Music in the Middle Ages**

Su. 3 cl.  
 Prereq.: 521 or 531, and 243.  
 The development of western music through the 14th century.

**641†\* U G 3**  
**Music in the Renaissance**

W. 3 cl.  
 Prereq.: 521 or 531, and 243.  
 The development of musical styles from Dufay through Palestrina and Lassus.

**642\* U G 3**  
**Music in the Baroque Period**

Sp. 3 cl.  
 Prereq.: 521 or 531, and 243.  
 The development of musical styles from Monteverdi through Bach.

**643\* U G 3**  
**Music in the Classic Period**

A. 3 cl.  
 Prereq.: 521 or 531, and 243.  
 Vocal and instrumental music of the middle and late 18th century.

**644\* U G 3**  
**Music in the Romantic Period**

Su, W. 3 cl.  
 Prereq.: 521 or 531, and 243.  
 The music of the Romantic period in Germany and France.

**645 U G 3**  
**Modern Music**

Su, Sp. 3 cl.  
 Prereq.: 521 or 531, and 243.  
 Major trends in the development of music since 1900.

**646†\* U G 3**  
**The History of Music in the United States**

Su. 3 cl.  
 Prereq.: Junior or senior standing.  
 A survey of music in the United States from colonial times until the present.

**647† U G 3**  
**Individual Composers: Their Lives and Works**

W. 3 cl.  
 Prereq.: 521 or 531, and 243.  
 A comprehensive study of the works of an individual composer; topic varies from year to year.

**648\* U G 3**  
**Chamber Music Literature**

Su, A. 3 cl.  
 Prereq.: 521 or 531, and 243.  
 A survey of chamber music of the Classic and Romantic periods.

**649\* U G 3**  
**Symphonic Literature**

W. 3 cl.  
 Prereq.: 521 or 531, and 243.  
 A survey of orchestral music from the Classic period to the present.

**650†\* U G 3**  
**Choral Literature**

A. 3 cl.  
 Prereq.: 521 or 531, and 243.  
 A survey of choral music from the Renaissance to the present.

**651\* U G 3**  
**Opera Literature**

Sp. 3 cl.  
 Prereq.: 521 or 531, and 243.  
 A survey of the antecedents of opera and a study of representative works from each of the major periods in the history of opera.

**652 U G 3**  
**Song Literature**

A. 3 cl.  
 The study of song literature including historical and philosophical backgrounds selected to meet the needs of the student, artist, or teacher; program building.

**653\* U G 3**  
**Piano Literature**

Sp. 3 cl.  
 Prereq.: 521 or 531, and 243.  
 A study of the piano sonata and other characteristic forms from the pre-piano period to the present time. Haddad and Tetley-Kardos.

**654\* U G 3**  
**Organ Literature**

Sp. 3 cl.  
 Prereq.: 521 or 531, and 243.  
 A comprehensive survey from the earliest compositions to the works of present-day composers. Held.

**660 U G 3**  
**Advanced Conducting (Instrumental)**

Su (1st term), A, W, Sp. 3 cl.  
 Prereq.: 521 and 560.  
 An attempt to develop the power to interpret the larger forms of instrumental literature and to read from full score. McGinnis.

**661 U G 3**  
**Advanced Conducting (Vocal)**

Su (1st term), W, Sp. 3 cl.  
 Prereq.: 521 and 560.  
 Development of power to interpret the larger forms of choral literature and to read from full score. Casey.

**662 U G 2**  
**Choral Repertoire**

Su, A. 1 cl., 1 2-hr. lab.  
 Repeatable to a maximum of 6 cr. hrs.  
 Reading and study of sacred and secular choral literature. Casey.

**665 U G 3****Marching Band Techniques**

Sp. 2 1/2-hr. cl.

Not open to freshmen. Open to non-music majors with permission of instructor.

A study of the modern marching band including laboratory work in marching techniques, arranging techniques, and show planning.

**670 U G 3****Medieval, Renaissance, and Baroque Musical Instruments**

Sp. 3 cl.

A study of the early development of musical instruments and their uses; introduction to instrumental techniques and performance practices in these periods. Maas.

**680 U G 2****Collegium Musicum**

A, W, Sp. 2 hr. rehearsal, 1 cl. (alternate weeks).

Prereq.: 670.

Repeatable to a maximum of 6 cr. hrs.

Study and performance of music from the medieval, Renaissance, and baroque periods. Maas.

**681 U G 3****Liturgies**

W. 3 cl.

Historic liturgies of the church as a background for the work of the church musician; contemporary movements in liturgical practice. Held.

**682 U G 3****Hymnology**

A. 3 cl.

Prereq.: 423 or permission of instructor.

An historical survey of Christian hymnody; consideration of criteria for judging texts and tunes with regard to artistic quality and liturgical suitability. Held.

**683 U G 3****Techniques and Materials for Church Choirs**

Sp. 3 cl.

A study of anthem materials, chants and propers, with consideration of programming and performance. Held.

**684 U 2****Field Experience in Church Music**

A, W, Sp.

Prereq.: 560 and 683, or concur. 683.

Repeatable to a maximum of 6 cr. hrs.

Supervised experience in the actual church situation. Held.

**693 U G 1-5****Individual Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Individual studies in specified problems in the field of music.

**694 U G 1-5****Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Supervised group studies of special problems in the field of music.

**700 U G 1-2****Applied Music (Secondary)**

1 1-hr. lesson, studio classes arr.

Prereq.: Grad. standing in music or permission of the Director of the School of Music.

Repeatable to a maximum of 12 cr. hrs. for each decimal subdivision.

Applied music study in areas other than a student's major or principal area.

**700.01 Piano**

Su, A, W, Sp.

**700.02 Voice**

Su, A, W, Sp.

**700.03 Strings**

Su (1st term), A, W, Sp.

**700.04 Woodwinds**

Su (1st term), A, W, Sp.

**700.05 Brass**

Su (1st term), A, W, Sp.

**700.06 Organ**

Su (1st term), A, W, Sp.

**700.07 Percussion**

A, W, Sp.

**700.08† Harpsichord**

A, W, Sp.

**700.09 Harp**

A, W, Sp.

**701 U G 1-2****Applied Music (Principal)**

1 1-hr. lesson, studio classes arr.

Prereq.: Placement exam. or permission of applied area faculty.

Repeatable to a maximum of 12 cr. hrs. for each decimal subdivision.

Applied music study with special emphasis on literature and performance practices.

**701.01 Piano**

Su, A, W, Sp.

**701.02 Voice**

Su, A, W, Sp.

**701.03 Strings**

Su (1st term), A, W, Sp.

**701.04 Woodwinds**

Su (1st term), A, W, Sp.

**701.05 Brass**

Su (1st term), A, W, Sp.

**701.06 Organ**

Su (1st term), A, W, Sp.

**701.07 Percussion**

A, W, Sp.

**701.08† Harpsichord**

A, W, Sp.

**701.09 Harp**

A, W, Sp.

**711 U G 3****Theory Pedagogy**

Su. 5 cl.

Prereq.: Mus. 4th yr. standing.

The teaching of music theory in colleges and secondary schools.

**732\* U G 3****Fugue**

Sp. 3 cl.

Prereq.: 631.

Detailed study of the fugue; writing of three- and four-voiced fugues.

**752 U G 3****Performance Literature**

Su, A, W, Sp. 3 cl.

Prereq.: Admission to M.M. curriculum or permission of instructor.

Repeatable to a maximum of 6 cr. hrs. for each decimal subdivision.

Intensive study of representative literature for the instrument from each style period.

**752.01 Piano****752.02 Voice****752.03 Strings****752.04 Woodwinds****752.05 Brass****752.06 Organ****752.07 Percussion****760 U G 3****Basic Concepts in Music Education**

Su, A. 3 cl.

Prereq.: 586 or 587 or equiv.

The principles of music education and of the educational and cultural objectives derived from related disciplines which give direction and purpose to the music education program. Cady and Tolbert.

**761 U G 3****Principles of Music Learning**

Sp. 3 cl.

Prereq.: 586 or 587 or equiv.

Analysis of the learning process in music as related to problems of music instruction to the public school. Costanza.

**762\* U G 3****Principles and Practices in Elementary School Music**

Su (1st term). 3 cl.

Prereq.: 571 or equiv.

Analysis and appraisal of the music program in elementary schools including the relationship of music to the total school program. Tolbert.

**763†\* U G 3****Literature of Elementary School Music**

Su (1st term). 3 cl.

Prereq.: 571 or equiv.

A critical study of folk and art music of various cultures and historic periods for the general vocal and listening activities of the integrated curriculum. Tolbert.

**764\* U G 3****Principles and Practices in Vocal Music Education**

Su (1st term). 3 cl.

Prereq.: 575 or equiv.

Analysis and appraisal of the organization, purpose, and development of the vocal music program in secondary schools.

**765†\* U G 3****Literature for Vocal Music Education**

Su (2nd term). 3 cl.

Prereq.: 575 or equiv.

A study of vocal literature of various cultures and historic periods for use with choral groups in the secondary music program.

**766\* U G 3****Teaching Practices in General Music**

Su (2nd term). 3 cl.

Prereq.: 573 or equiv.

Study of current concepts in organizing and teaching general music in the secondary school. Ramsey.

**767\* U G 3****Curricular Trends in General Music**

Su (1st term). 3 cl.

Prereq.: Permission of instructor.

Analysis and development of programs in general music in which music is taught with reference to other art forms. Meeker and Tolbert.

**768\* U G 3****Principles and Practices in Instrumental Music Education**

Su (1st term). 3 cl.

Prereq.: 577 or equiv.

Role of instrumental music in the public schools: relationship to society and the total music program, historical development, evaluation, and future trends. Meeker.

**769\* U G 3****Literature for Instrumental Music Education**

Su (1st term). 3 cl.

Prereq.: 577 or equiv.

Relationship of teaching materials and performance repertory to education objectives: selection of literature, interpretation, rehearsal procedures, conducting problems, attainment of musical understanding through literature. Meeker.



770

U G 3

**Introduction to Research in Music Education**

Su (1st term). 3 cl.

Prereq.: 586 or 587 or equiv.

A study of methods of research as applied to problems in school music. Costanza and Meeker.

771†\*

U G 5

**Supervision of Music Education Programs**

Su. 3 cl.

Prereq.: Permission of instructor.

A study of specific problems of music supervision with special attention to music program evaluation and curriculum development. Ramsey.

786

U G 3

**Introduction to Bibliographic Method**

Su, A. 3 cl

Prereq.: 521 or 531, and 243.

The collection, examination, and documentation of information about music; including general as well as music library materials. Mixer.

790

U G 1-5

**Problems in Vocal Music Education**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

Study of problems encountered in the teaching and supervising of vocal music.

791

U G 1-5

**Problems in Instrumental Music Education**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

Study of problems encountered in teaching, supervising, and organization of the instrumental music program.

792

U G 1-5

**Choral Problems**

Su (1st term), A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

Study of the problems encountered in developing choruses and church choirs. Casey.

793

U G 1-5

**Individual Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Individual studies in specified problems in the field of music.

794

U G 1-5

**Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Supervised group studies of special problems in the field of music.

801

G 1, 2, or 4

**Applied Music (Principal)**

1 1-hr. lesson, studio classes arr.

Prereq.: Placement exam. or permission of applied area faculty.

Open to other qualified students within the limits of instructional facilities by permission of Director of School of Music.

Repeatable to a maximum of 16 cr. hrs. for each decimal subdivision.

Advanced applied music study with emphasis on musicianship, pedagogical techniques, and literature.

**801.01 Piano**

Su, A, W, Sp.

**801.02 Voice**

Su, A, W, Sp.

**801.03 Strings**

Su (1st term), A, W, Sp.

**801.04 Woodwinds**

Su (1st term), A, W, Sp.

**801.05 Brass**

Su (1st term), A, W, Sp.

**801.06 Organ**

Su (1st term), A, W, Sp.

**801.07 Percussion**

A, W, Sp.

**801.08† Harpsichord**

A, W, Sp.

**801.09 Harp**

A, W, Sp.

802

G 2 or 4

**Applied Music (Major)**

1 1-hr. lesson, studio classes arr.

Prereq.: Placement exam.

Repeatable to a maximum of 16 cr. hrs. for each decimal subdivision.

A specialized and intense study of literature and techniques of performance.

**802.01 Piano**

Su, A, W, Sp.

**802.02 Voice**

Su, A, W, Sp.

**802.03 Strings**

Su (1st term), A, W, Sp.

**802.04 Woodwinds**

Su (1st term), A, W, Sp.

**802.05 Brass**

Su (1st term), A, W, Sp.

**802.06 Organ**

Su (1st term), A, W, Sp.

**802.07 Percussion**

A, W, Sp.

**802.08 Harpsichord**

A, W, Sp.

**802.09 Harp**

A, W, Sp.

**803 G 4****Conducting**

Su, A, W, Sp. 3 cl., 1 1-hr. lab.

Prereq.: Placement examination.

Open only to conducting majors in the M.M. curriculum.

Repeatable to a maximum of 12 cr. hrs. for each decimal subdivision.

A specialized and intense study of conducting techniques.

**803.01 Choral**

**811† G 3****Piano Pedagogy**

Su (1st term). 5 cl.

Prereq.: 611 or equiv. and admission to M.M. or M.A. programs in piano.

A critical analysis of various methods and principles of piano instruction, and of literature for beginning and intermediate performers.

**812\* G 3****Vocal Pedagogy**

W. 5 cl.

Prereq.: Mus. grad. standing and minimum of 6 cr. hrs. of applied study in voice.

An analysis of the principles and practices current in the teaching of voice.

**813†\* G 3****String Instrument Pedagogy**

Su (1st term). 5 cl.

Prereq.: Mus. grad. standing and minimum of 6 cr. hrs. of applied study in string instruments.

An analysis of the principles and practices current in the teaching of strings.

**814\* G 3****Woodwind Instrument Pedagogy**

Su (1st term). 5 cl.

Prereq.: Mus. grad. standing and minimum of 6 cr. hrs. of applied study in woodwind instruments.

An analysis of the principles and practices current in the teaching of woodwinds. Titus.

**815†\* G 3****Brass Instrument Pedagogy**

Su (1st term). 5 cl.

Prereq.: Mus. grad. standing and minimum of 6 cr. hrs. of applied study in brass instruments.

An analysis of the principles and practices current in the teaching of brass instruments.

**821 G 5****Advanced Analysis: The Classic Period**

A. 3 cl.

Prereq.: 621 or 622.

An analytical study of selected major works from the classic literature.

**822 G 5****Advanced Analysis: The Romantic Period**

Su, W. 3 cl.

Prereq.: 2 of the following courses: 621, 622, or 821.

An analytical study of selected major works from the romantic literature. Poland.

**823 G 5****Advanced Analysis: Post-Romantic to Modern Music**

Sp. 3 cl.

Prereq.: 821 or 822.

Analysis of selected works reflecting the evolution from the post-romantic period to contemporary styles. Poland.

**826 G 5****Development of Music Theory I**

A. 3 cl.

A study of the principal treatises on music theory before 1400. Phelps.

**827 G 5****Development of Music Theory II**

Su, W. 3 cl.

A study of the principal treatises on music theory from 1400 to 1700. Phelps.

**828 G 5****Development of Music Theory III**

Sp. 3 cl.

Critical study of music and theory texts from 1700 to 1900. Phelps.

**829 G 5****Contemporary Theories of Music**

Sp. 3 cl.

Prereq.: Mus. grad. standing.

Fundamental concepts of theory construction and experimental verification of contemporary theories of music. Poland.

**831\* G 3****Contrapuntal Techniques**

Sp. 3 cl.

Prereq.: 631.

Analysis and stylistic writing of canons, invertible counterpoint, and variations.

**833 G 3****Contrapuntal Techniques**

A.

Prereq.: Permission of instructor.

Contrapuntal techniques in the works of 20th-century composers.

**834 G 3****Modal Counterpoint II**

Sp. 3 cl.

Prereq.: 634.

Advanced counterpoint based on the vocal polyphonic style of the 16th century. Kuehefuhs.

**835 G 3-5****Advanced Composition**

Su, A, W, Sp.

Prereq.: 2 qtrs. of 635 or equiv.

Repeatable to a maximum of 15 cr. hrs.

Creative writing in the large forms at an advanced level. Barnes.

**837 G 3****Advanced Electronic Composition**

W, Sp. 3 cl.

Prereq.: 637.

Repeatable to a maximum of 6 cr. hrs.

Creative writing at an advanced level employing electronic sound sources.

**838 G 3****Seminar in Experimental Music**

A, W, Sp. 3 cl.

Prereq.: 636.

The application of electronic devices to analytical and experimental problems in music.

**841\* G 5****Studies in Medieval Music**

A, Sp. 3-5 cl.

Problems and research in music before 1400. Hoppin.

**842\* G 5****Studies in Renaissance Music**

W. 3-5 cl.

Problems and research in music between 1400 and 1600. Mixer.

**843\* G 5****Studies in Baroque Music**

A. 3-5 cl.

Problems and research in music between 1600 and 1750. Livingston.

**844†\* G 5****Studies in Classic Music**

A. 3-5 cl.

Problems and research in music of the late 18th century. Livingston.

**845\* G 5****Studies in Romantic Music**

Su. 3-5 cl.

Problems and research in music of the 19th century. Livingston.

**846†\* G 5****Studies in Modern Music**

Su, Sp. 3-5 cl.

Problems and research in music of the 20th century. Hoppin.

**847† G 5****Development of Notation: 900-1600**

A. 3 cl.

Prereq. or concur.: 640.

A survey of notational principles from Gregorian neumes through the mensural system of the Renaissance, with exercises in transcription.

**848 G 5****Advanced Studies in Notation**

Su, W. 3 cl.

Prereq.: 847.

An intensive investigation of the problematic aspects of pre-mensural and mensural notation.

**850†\* G 5****The History of Performance Practices**

A, Sp. 3 cl.

A study of primary sources pertaining to contemporary attitudes and practices in the performance of music from the Middle Ages to the present. Livingston.

**851†\* G 5****Musical Sources and Historiography**

Sp. 3 cl.

Prereq.: 786.

A study of music historiography, supplemented by the examination of musical documents from each of the periods of music history. Mixer.

**852 G 3****Performance Literature**

Su, A, W, Sp. 3 cl.

Prereq.: 752 and admission to D.M.A. program.

Repeatable to a maximum of 18 cr. hrs.

Concentrated study of representative literature from each style period.

**852.01 Piano****852.02 Voice****852.03 Violin****852.06 Organ****872†\* G 3****Administration in Music Education**

Sp. 3 cl.

Prereq.: Permission of instructor.

Seminar.

**873†\* G 5****Seminar: Comparative Music Education**

Su. 3-5 cl.

Prereq.: Permission of instructor.

An analysis and comparison of music education programs in other countries including the study of curriculum, teaching procedures, and programs of teacher preparation. Tolbert.

**874 G 5****Seminar: The Development of Music Education**

Su. 3-5 cl.

Prereq.: Permission of instructor.

The development of music education from the early Greek society to the present day tracing major trends and the influence of certain persons. Cady.

**875 G 5****Seminar: Psychological Factors in Music Education**

A. 3-5 cl.

Prereq.: 761.

A study of the psychological factors, theory, and research in the musical development of children and adolescents with implications for school music education programs. Costanza.

**876 G 5****Seminar: Evaluation and Measurement in Music Education**

Sp. 3-5 cl.

Prereq.: 761 and Psych. 510.

A study of the theory, principles, and techniques of evaluation and measurement in music education. Costanza.

**877 G 5**

**Seminar: Social Factors in Music Education**

W. 3-5 cl.

Prereq.: 760.

A study of the social influences on music education and their relationship to school music programs and practices. Cady.

**878\* G 5**

**Seminar: Music Education and the Curriculum**

Sp. 3-5 cl.

Prereq.: 875 and 877 or permission of instructor.

A study of theory and practice of curriculum development in school music. Cady and Ramsey.

**879 G 5**

**Seminar: Music in Higher Education**

A. 3-5 cl.

The role of music in higher education historically and in contemporary education, including its philosophical bases, degree programs, and organization. Cady.

**882 G 2**

**Performance Problems**

Su, A, W, Sp. 2 cl.

Prereq.: Admission to the D.M.A. program.

Each decimal subdivision repeatable to a maximum of 6 cr. hrs.

Seminar in performance problems.

**882.01 Piano**

**882.02 Voice**

**882.03 Violin**

**882.06 Organ**

**Medieval and Renaissance Culture**

(See Medieval and Renaissance Studies 888.)

**Medieval and Renaissance Literature**

(See Medieval and Renaissance Studies 889.)

**899 G 1-5**

**Interdepartmental Seminar**

A, W, Sp.

**902 G 2 or 4**

**Applied Music (Major)**

Su, A, W, Sp. 1-2 1-hr. lessons, studio classes arr.

Prereq.: Placement exam.

Open only to students admitted to D.M.A. program.

Repeatable to a maximum of 12 cr. hrs in each decimal subdivision.

Advanced study of music literature in performance including concert recital presentation.

**902.01 Piano**

**902.02 Voice**

**902.03 Violin**

**902.06 Organ**

**993 G 1-5**

**Individual Studies**

Su, A, W, Sp.

Repeatable to a maximum of 15 cr. hrs.

Individual research projects not connected with the dissertation.

**994 G 3-5**

**Group Studies**

Su, A, W, Sp.

Repeatable to a maximum of 15 cr. hrs.

**994.01 Seminar in Music Theory**

Barnes, Phelps, and Poland.

**994.02 Seminar in Music Education**

Cady and Costanza.

**994.03 Seminar in Music History**

Livingston and Hoppin.

**995 G 1-5**

**Advanced Research Practicum**

Su, A, W, Sp.

Prereq.: 45 grad. cr. hrs. and permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

Utilization of research processes and creative techniques appropriate to the field of inquiry—analysis, survey, experimentation, historiography, philosophy.

**998 G Arr.**

**Research in Music: Thesis**

Su, A, W, Sp.

Research for thesis purposes only.

**999 G Arr.**

**Research in Music: Dissertation**

Su, A, W, Sp.

Research for dissertation purposes only.

## National Security Policy Studies

Office: 199 West 10th Avenue

Mershon Center for Education in National Security,

Richard C. Snyder (Director), Charles F. Hermann, (Associate Director).

**200 U 5**

**National Security Policy and Policymaking**

W.

Survey and policies affecting the security of the United States and of the processes by which such policies are formulated, executed, and appraised.

**693 U G 1-5**

**Individual Studies in National Security Policy**

A, W, Sp.

Prereq.: Permission of instructor.

A special national security topic is assigned to each student for reading and a report.

**702 U G 3-5**  
**Introduction to National Security**

A. 1 cl.

Prereq.: Permission of instructor.

Examination of approaches taken by various social science disciplines to field of national security; survey of literature in field; identification of major problem areas.

**785 U G 3-5**  
**Research Principles and Techniques in Leadership and Public Policy**

W. 1 cl.

Prereq.: Permission of instructor.

Repeatable with permission of instructor to a maximum of 10 cr. hrs.

Examination of leadership and policy problems and the application thereto of social science analytical techniques and findings.

**801 G 3-5**  
**Seminar On Social Science Relationships to Public Policy**

A, W, Sp. 1 cl.

Prereq.: Permission of instructor.

Repeatable with permission of instructor to a maximum of 10 cr. hrs.

Examination of the contribution of the social and behavioral sciences to specific public policy issues between and within national societies.

**489 U 3**  
**Work Experience in Natural Resources**

Su, A, W, Sp. Equiv. of 10 wks. employment.

Prereq.: Permission of major adviser.

Not open to students with credit for Conserv. 489.

Repeatable to a maximum of 6 cr. hrs.

The student must secure approval of adviser prior to employment, and submit a final written report by fourth week of first quarter in school following the work.

**510 U G 5**  
**Natural History of Ohio**

Su, Sp. 3 cl. and arr. field trip.

Cannot be taken concur. with Bot. 210 or Zool. 220.

Geology and soils, vegetation types and regions; major wildlife; field work on ecology, observation techniques, and identification skills.

**540 U G 3**  
**Principles of Park and Recreation Management**

A. 3 cl.

Prereq.: 201, or equiv. with permission of instructor.

Policies, rules and regulations, boards and commission agendas, land acquisition procedures, basic maintenance and operation of park systems; management of marinas and reservoirs. Schick.

**600 U G 4**  
**Natural Resources Problems, Programs, and Policies**

W. 2 2-hr. cl.

Prereq.: 201 or Geog. 530.

Not open to students with credit for Agr. Econ. 680 or Nat. Res.. 640.

Analytical study of contemporary and future problems of natural resources conservation and programs and policies related to their solution. Johnson.

## Natural Resources

Office: School of Natural Resources, 246 Lord Hall, 124 West 17th Avenue

**Professors** Teater (Director), Bookhout, Cowen, Gatherum, Good, Johnson, Kriebel, Larson, Murphy, Pettyjohn, Schick, Schwab, Taft, Touse, and Tubb; **Associate Professors** Brown, Momot, Roth, Stockdale, Vimmerstedt, Vogt, and Whitmore; **Assistant Professors** Andrew, Clark, Curnow, Disinger, Hackney, Houston, Townshend, Weidensaul, and Wheatley; **Instructor** Pierce.

**201 U 3**  
**Introduction to Conservation of Natural Resources**

A, Sp. 3 cl., 2 1-day field trips.

Not open to students with credit for Conserv. 201.

Nature and scope of conservation problems; technical and socio-economic aspects of the solution of conservation problems. Roth.

**202 U 3**  
**Conservation Agencies**

W. 3 cl.

Prereq.: 201 or Geog. 530.

Not open to students with credit for Conserv. 202.

History and responsibilities of governmental agencies and some private organizations for natural resources management; representatives of conservation agencies present programs and problems. Johnson.

**601 U G 4**  
**Interactions in Natural Resources Management**

A. 2 2-hr. cl.

Prereq.: Permission of instructor.

Impact of man's activity on natural resources; interrelationships between resources and physical and social environment and prospects for effective resources management. Disinger.

**610 U G 5**  
**Interpretive Work**

Su, Sp. 2 2-hr. cl. and arr. field trips.

Prereq.: Biol. 313 or equiv., Bot. 210 or Forest. 222, Geol. 102, and 5 cr. hrs. Psychol. or equiv.

Professional course for park naturalists, teachers, and outdoor education workers; history of interpretive work; philosophy and objectives; case studies of programs; interpretive techniques; and evaluation. Johnson.

**611 U G 6**  
**Field Course in Conservation and Outdoor Education**

Su (1st term).

Concur.: 694.01 for 3 cr. hrs., and permission of instructor.

Study and field work in natural history, resources management, and conservation and outdoor education. Roth.

**620 U G 5****Management of Fisheries**

W. 5 cl.

Prereq.: Biol. 313 or equiv.

Not open to students with credit for Zool. 660.

Fisheries resource management problems and programs including biological, economic, and social factors of local, national, and international importance. Momot.

**621 U G 5****Principles of Wildlife Management**

A, W. 5 cl.

Prereq.: Biol. 313 or equiv.

Introduction to the social, economic, and biological principles related to the management and utilization of wildlife resources. Good.

**622 U G 15****Field Laboratory in Renewable Natural Resources Management**

Sp. Full time of student arr. in the field and classroom.

Prereq.: 620 or 621, and permission of instructor.

Field experience in identifying and solving problems in the management of renewable natural resources; work in a variety of habitats using appropriate tools and techniques. Good and Momot.

**642 U G 3****Urban Parks and Recreation Management**

Sp. 3 cl.

Prereq.: 540.

Organization and administration of metropolitan, county, and municipal areas; land acquisition and planning of these facilities. Schick.

**643 U G 3****Outdoor Recreation by Private Enterprise**

W. 3 cl.

Prereq.: 540, Econ. 201, or equiv. with permission of instructor.

Factors affecting the development of the various types of recreational facilities; case studies of several private recreation areas. Pierce and Schick.

**644 U G 5****Park Design**

W. 3 cl., 2 2-hr. lab.

Prereq.: 540.

Interrelationship of facility design and recreation land management, including various types of parks and criteria for their location and design.

**684 U G 6-15****Internships in Natural Resources Professions**

Su, A, W, Sp. Arr.

Prereq.: Permission of division chairman.

Repeatable to a maximum of 15 cr. hrs.

Internship employment for a minimum of three months in natural resources professions arranged with cooperating natural resources or environmental agencies, organizations, or industries.

**684.01 Environmental Education****684.02 Fisheries and Wildlife****684.03 Forestry****684.04 Parks and Recreation Administration****684.05 Resource Development****692 U G 3****Workshop in Environmental Education**

A, W, Sp. 1 3-hr. cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 9 cr. hrs.

Problems of instruction in environmental education with consideration of both traditional approaches and current developments in content and methodology. Disinger.

**693 U G 2-5****Individual Studies in Natural Resources**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

**694 U G 2-5****Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 10 cr. hrs. for each subdivision.

Group studies on the nature and management of natural resources encompassed in one of the following areas:

**694.01 Conservation and Outdoor Education****694.02 Fisheries and Wildlife****694.03 Forestry****694.04 Parks and Recreation****694.05 Resource Development****694.06 Unclassified****785 U G 4****Research Methods in Natural Resources Management**

W. 2 2-hr. cl.

Prereq.: Math. 117, 123, or 125; an introductory course in Statistics, and permission of instructor.

Research design; experimental procedures; information-gathering tools, including reporting units for resource-related data; statistical methods; and procedures for analysis of data.

**797 U G 1-5****Interdepartmental Seminar**

Su, A, W, Sp.

(Offered in cooperation with the Department of Civil Engineering.)

(See under Interdepartmental Seminars.)

**811 G 3****Program Development in Environmental Education**

A. 1 3-hr. cl.

Prereq.: 692 or equiv. and permission of instructor.

Development of environmental education programs with respect to the situations of participants. Existing programs are studied as models to aid in development of unique programs. Roth.

**840 G 3****Policies Relating to Governmental Recreation Areas**

A. 3 cl.

Prereq.: 540, and 642 or 643, or 644, or equiv. with permission of instructor.

Organizational policies and structures relating to federal, state, and local governmental agencies. Schick.

**897 G 1**  
**Interdepartmental Seminar in Natural Resources**  
 Su, A, W, Sp.  
 (See under Interdepartmental Seminars.)

**999 G Arr.**  
**Research**  
 Su, A, W, Sp.  
 Research for thesis or dissertation purposes only.

## Naval Science

Office: 179 Physical Education Building, 337 West 17th Avenue

Captain J. M. Mason, USN, and Staff.

The sequence of courses is the same for all officer candidate students for the first two years. At the end of the second year, students may apply for the Marine Corps Option, in which case there is a variation in course presentation. All candidates are required to complete a course in American Military Affairs, in National Security Policy, and in Computer Science by the end of the third year in the NROTC Program. Additional courses in mathematics and physical sciences must be completed by the end of the second year. Descriptions of these course requirements, for each category of candidate, are available from the department office.

Candidates should consult the appropriate Naval Science Department instructor when preparing class schedules. Naval science courses are open to a limited number of civilian students with permission of the Professor of Naval Science.

Normal sequence of Naval Science courses is as follows:

**First Year:** All candidates—154, 152, 153.  
**Second Year:** All candidates—261, 262, 263.  
**Third Year:** Navy candidates—342, 343, 341.  
 Marine candidates—351, 352, 353.  
**Fourth Year:** Navy candidates—475, 476, 477.  
 Marine Candidates—451, 452, 453

**152 U 3**  
**Naval Administration and Introduction to Naval Ships Systems**  
 W. 3 cl., 1 2-hr. lab.  
 Prereq.: 154.  
 Continuation of naval organization and management practices and a familiarization of types, structure, and purpose of ships.

**153 U 3**  
**Naval Ships Systems I**  
 Sp. 3 cl., 1 2-hr. lab.  
 Prereq.: 152.  
 Study of ships compartmentation, propulsion systems, auxiliary power systems, ship design, stability, and safety.

**154 U 3**  
**Survey of Naval Science**  
 A. 3 cl., 1 2-hr. lab.  
 Prereq.: Enrollment in NROTC Unit or permission of professor.  
 An introduction to and survey of disciplines peculiar to naval science including a discussion of naval tasks and missions, regulations, customs, traditions, and organizational relationships.

**261 U 3**  
**Naval Weapons Systems II**  
 A. 3 cl., 1 2-hr. lab.  
 Prereq.: 153 or permission of instructor.  
 Investigation of concept and technique of weapons systems, linear analysis of ballistics, and the dynamics of the basic components of weapons control systems.

**262 U 3**  
**Naval Weapons Systems III**  
 W. 3 cl., 1 2-hr. lab.  
 Prereq.: 261.  
 Further development of the basic principles of naval weapons.

**263 U 3**  
**Principles of Naval Organization and Administration**  
 Sp. 3 cl., 1 2-hr. lab.  
 Prereq.: 262.  
 Introduction to the structure and principles of naval organization and management.

**341 U 3**  
**Naval Operations**  
 Sp. 3 cl., 1 2-hr. lab.  
 Prereq.: 343.  
 A study of fleet operations, including tactics, tactical communications; rules of the Nautical Road, and the principles of relative motion.

**342 U 3**  
**Naval Operations and Introduction to Navigation**  
 A. 3 cl., 1 2-hr. lab.  
 Prereq.: 263.  
 A study of the Naval Communications system, shipboard organization and administration, and the electronic and dead reckoning methods of marine navigation.

**343 U 3**  
**Celestial Navigation**  
 W. 3 cl., 1 2-hr. lab.  
 Prereq.: 342.  
 The determination of position by celestial methods of navigation.

**351†\* U 3**  
**Evolution of the Art of War, Part I**  
 A. 3 cl., 1 2-hr. lab.  
 Prereq.: 253 or completion of summer camp.  
 A study of the evolution of weapons and tactics, illustrating the principles and variables of war used in certain battles from Alexander through the Mexican War.

**352†\* U 3****Evolution of the Art of War, Part II**

W. 3 cl., 1 2-hr. lab.

Prereq.: 351.

A continuation of the study of evolution of the art of war from the beginning of the Civil War to the end of World War II.

**353†\* U 1****Modern Basic Military Strategy and Tactics**

Sp. 1 2-hr. Sem.

Prereq.: 352.

A survey of modern strategical and tactical principles, and current military developments.

**451\* U 3****Amphibious Warfare, Part I**

A. 3 cl., 1 2-hr. lab.

The history of amphibious warfare and its development from Gallipoli through Korea.

**452\* U 3****Amphibious Warfare, Part II**

W. 3 cl., 1 2-hr. lab.

A study of the doctrinal techniques and present concepts of amphibious warfare, including the planning phase.

**453\* U 1****Leadership and the Uniform Code of Military Justice**

Sp. 1 2-hr. Sem.

Survey of the UCMJ and a study of the psychology of human relationships and techniques of leadership as applied by Marines.

**474† U 3****Naval Engineering**

Sp. 3 1-hr. cl., 1 2-hr. lab.

Prereq.: Permission of instructor.

Not open to students with credit for 152 or 153.

Ship stability and buoyancy applications in shipboard damage control; theory of design, construction, and operation of modern naval steam engineering plants; shipboard organization and administration.

**475 U 2****Seapower and Maritime Affairs I**

A. 2 2-hr. Sem.

Prereq.: 343.

An analysis of seapower and maritime affairs as related to the naval forces of the United States.

**476 U 2****Seapower and Maritime Affairs II**

W. 2 2-hr. Sem.

Prereq.: 475.

A continuation of 475.

**477 U 2****Naval Leadership**

Sp. 2 2-hr. Sem.

Prereq.: 476.

A seminar study of the human relations, leadership problems, and decisions which confront the naval officer today.

**Nuclear Engineering**

Office: 2075 Robinson Laboratory, 206 West 18th Avenue

**Professors** Redmond (Chairman), Glower, and Nicholson; **Associate Professors** Buxton and Carey; **Adjunct Associate Professor** Epstein; **Assistant Professors** Miller, Nakamura, and Schlosser.

**505 U G 3****Introduction to Nuclear Science and Engineering**

Su, W, Sp. 3 cl.

Prereq.: Math. 255 and Physics 133, or permission of instructor.

Discussion of nuclear energy and nuclear radiation; sources, methods of utilization, and projections for future engineering uses.

**606 U G 3****Radiological Safety**

A. 2 cl., 1 2-hr. lab.

Prereq.: Permission of instructor.

General principles of radiation, radioactivity, and protection methodology with emphasis on approved operating, handling and waste disposal procedures and regulations, and biological interactions.

**610 U G 3****Uses of Nuclear Radiations**

A, Sp. 3 cl.

Prereq.: Physics 580.01 and Math 255, or permission of instructor.

Not open to students with credit for 710.

Industrial and research applications of radioactive isotopes; thickness and density, food irradiation, direct energy conversion, activation analysis, radioactive tracers, and topics in bioengineering.

**626 U G 3****Introduction to Nuclear Power**

Su, W. 3 cl.

Prereq.: Physics 580.01 and Math. 255, or permission of instructor.

Nuclear power reactors; the economic and technical aspects of the nuclear power industry.

**Corrosion**

(See under Met. E. 635.)

**660 U G 5****Introduction to Nuclear Reactor Theory**

A. 5 cl.

Prereq.: Math. 255 and Physics 580.01, or permission of instructor.

Introduction to the concepts of radioactive decay, cross-sections, the multiplication constant and neutron flux and to slowing-down theory, diffusion theory, Fermi-age theory, reactor kinetics, and reactor shielding.

**Materials of Nuclear Technology**

(See under Met. E. 675.)



**712 U G 3****Introduction to the Production, Interaction, and Detection of Nuclear Radiations**

A. 3 cl.

Prereq. or concur.: Physics 580.01.

Nuclear structure, stability, reactions, and decay; interactions of electromagnetic and charged particle radiation with matter, scattering theory, and bremsstrahlung; basic processes in radiation measurements and radiation damage.

**716 U G 3****Nuclear Plant Safety**

Sp. 3 cl.

Prereq.: 660 and Chem. E. 778.

Modeling theory developed and applied to nuclear systems to facilitate analysis of possible nuclear accidents; nuclear incidents, accident description criteria for evaluation, nuclear plant siting and operational procedures.

**720 U G 3****Reactor Dynamics and Control**

Sp. 3 cl.

Prereq.: 660 and Elec. E. 520 or permission of instructor.

Not open to students with credit for 820.

Nuclear reactor and nuclear reactor system operation; control system performance requirements and control mechanisms; automatic control systems and their performance with transient and with steady state operation.

**Nuclear Power Plants**

(See under Mech. E. 636.)

**743 U G 3****Nuclear Engineering Laboratory I**

Su, A, W, Sp. 2 3-hr. lab.

Prereq.: Physics 580.01 or equiv., and Math. 255.

Experimental investigations of nuclear radiation interactions with matter; a discussion and experimental verification of radiation detection and shielding principles.

**744 U G 3****Nuclear Engineering Laboratory II**

Su, A, W, Sp. 2 3-hr. lab.

Prereq.: 660 and 743.

Experimental nuclear reactor analysis; understanding of the basic nuclear and reactor parameters and utilizing these fundamental concepts in an economical engineering design.

**747 U G 3****Nuclear Instrumentation**

Su, A, W, Sp. 2 cl., 1 3-hr. lab.

Prereq.: 743, Elec. E. 520 or equiv., and Physics 580.05; or permission of instructor.

Repeatable to a maximum of 9 cr. hrs.

A study of radiation detectors, measuring instruments, block diagrams and circuits; discussion of applications to nuclear research and applied measurement systems.

**765 U G 3****Analysis of Neutron Chain Reactions**

W. 3 cl.

Prereq.: 660 and Math. 512; concur. Physics 580.05; or permission of instructor.

The neutron distributions in infinite and finite mediums are analyzed with particular emphasis placed upon asymptotic solutions, space dependent slowing down theory, multigroup slowing down theory, and transport theory.

**766 U G 4****Nuclear Reactor Analysis**

Sp. 3 cl., 1 2-hr. lab.

Prereq.: 765.

Not open to students with credit for 763.

Reactor theory, probability concepts and nuclear cross sections, the multiplication constant and neutron flux, neutron slowing down process, diffusion theory, Fermi Age Theory, homogeneous reactors, heterogeneous reactors, and reactor kinetics.

**767 U G 3****Numerical Methods in Reactor Analysis**

Su. 3 cl.

Prereq.: 766, Math. 514, and Engr. Gr. 200 or equiv.

The calculations of nuclear reactor properties using matrix methods and iterative procedures; primary emphasis on the age-diffusion theory multigroup methods.

**770 U G 3****Plasmas and Controlled Fusion**

W. 3 cl.

Prereq.: Physics 580.05; and Mech. E. 511, or permission of instructor.

The Thermonuclear problem; approaches to a stable and sufficiently hot plasma; nuclear reactions, plasma kinetics, diagnostic devices, and engineering problems in research, development, and power production.

**Nuclear Chemical Engineering**

(See under Chem. E. 778.)

**793 U G 1-10****Individual Studies in Nuclear Engineering**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 18 cr. hrs.

Affords the qualified student the opportunity for independent reading, study, or laboratory work in a specialized field of interest.

**794 U G 1-10****Group Studies in Nuclear Engineering**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 18 cr. hrs.

Special group studies of a selected area of nuclear engineering not provided in other courses.

**845 G 1-6****Advanced Laboratory Studies**

Su, A, W, Sp.

Prereq.: 743 or 744, and permission of instructor.

Experimental treatment of advanced nuclear engineering concepts.

**880 G 3****Advanced Topics**

Su, A, W, Sp. 3 cl.

Prereq.: Permission of instructor.

Each subdivision repeatable to a maximum of 12 cr. hrs.

An advanced course of study for special topics in nuclear engineering; topics will be announced each quarter.

- 880.01 Reactor Physics
- 880.02 Reactor Kinetics
- 880.03 Reactor Design
- 880.04 Fuel Management
- 880.05 Radiation Effects
- 880.06 Radiation Transport and Shielding
- 880.07 Plasmas and Controlled Fusion
- 880.08 Nuclear Instrumentation
- 880.20 Special Topics

**881 G 1****Nuclear Engineering Seminar**

A, W, Sp. 1 cl.

Prereq.: Grad. standing in Nuclear E.

Repeatable to a maximum of 4 cr. hrs.

Current topics in nuclear engineering.

**999 G Arr.****Research in Nuclear Engineering**

Su, A, W, Sp.

Research for thesis or dissertation purposes only.

**503 P 15****Pediatric Anesthesia**

Su, A, W, Sp.

Prereq.: 502.

Advanced study of introductory and clinical anesthesia as applicable to pediatric anesthesia; training is received at the affiliated Children's Hospital. Jones and Lang.

**504 P 15****Advanced Anesthesia I**

Su, A, W, Sp.

Prereq.: 503.

Repeatable to a maximum of 45 cr. hrs.

Emphasis of study will be on more difficult anesthetic procedures and in patients with difficult disease processes. Jones and Lang.

**505 P 15****Advanced Anesthesia II**

Su, A, W, Sp.

Prereq.: 504.

Instruction in the care of the patient undergoing cardiopulmonary bypass and thoracic anesthesia. Jones and Lang.

**506 P 15****Advanced Anesthesia III**

Su, A, W, Sp.

Prereq.: 505.

Instruction in the care of the patient undergoing neurosurgery. Jones and Lang.

## Nurse Anesthesiology

(School of Allied Medical Professions)

Office: 435 School of Allied Medical Professions Building, 1583 Perry Street

**Instructor** Lang (Division Director); **Professor** Hamelberg; **Clinical Assistant Professors** Anderson, Delo, Prince, Reier, and Stone; **Instructor** Jones; **Clinical Instructors** Beach, Burchfield, LeVere, Marshall, McCullough, and Yutzy.

**501 P 15****Introduction to Anesthesia**

Su, A, W, Sp.

Prereq.: Graduation from an accredited school of nursing.

Education and training of nurses in the field of anesthesia; management of technical aspects of anesthesia under physician supervision. Jones and Lang.

**502 P 15****Clinical Anesthesia**

Su, A, W, Sp.

Prereq.: 501.

Advanced study of anesthetic agents, technics, pharmacology, and physiology with clinical applications. Jones and Lang.

## Nursing

Office: 145 School of Nursing Building, 1585 Neil Avenue

**Professor** Sills; **Associate Professors** Bellam, Buckeridge, Clark, Harvey, Kalafatich, Kruse, Leazenbee (Emeritus), Lewis (Emeritus), Pease, Ryan, Stevenson, and Thomas; **Assistant Professors** Daubenmire, Keith, Kim, Martin, Mourad, Polcyn, Schoenlaub, Schwartz, Shaw, Steiner, Wallace, and Williams.

**303 U 2-3****Basic Concepts and Skills in Patient Care**

A. 2 cl., 2-hr. lab.

Prereq.: Enrolled in a dental hygiene or allied medical professions clinical course.

Not open to students in nursing.

A study of selected concepts and skills in patient care used by health professionals.

**Open only to students registered in the School of Nursing:****305 U 5****Introduction to Theory and Nursing Process**

A. 3 cl., 2 2-hr. labs.

Prereq.: 1st yr. standing in Nursing.

Study of nature of theory; nursing process; experiences in observation, data collection in health and illness basic to nursing.

**306 U 5**  
**Introduction to Theory and Nursing Process**  
 W. 3 cl., 2 2-hr. labs.  
 Prereq.: 1st yr. standing in Nursing.  
 Continuation of 305.

**307 U 5**  
**Introduction to Theory and Nursing Process**  
 Sp. 3 cl., 2 2-hr. labs.  
 Prereq.: 1st yr. standing in Nursing.  
 Continuation of 305 and 306.

**315 U 5**  
**Process of Human Adaptation**  
 A. 4 cl., 1 2-hr. lab.  
 Prereq.: Sophomore standing.  
 Study of man's adaptative processes as they relate to the individual maturing in a family within a society.

**316 U 5**  
**Process of Human Adaptation**  
 W. 4 cl., 1 2-hr. lab.  
 Prereq.: Sophomore standing.  
 Continuation of 315.

**317 U 5**  
**Process of Human Adaptation**  
 Sp. 4 cl., 1 2-hr. lab.  
 Prereq.: Sophomore standing.  
 Continuation of 315 and 316.

**405 U 5**  
**Health Directed Nursing Interactions in Health Care Systems I**  
 A. 2 cl., 9 hrs. lab.  
 Prereq.: 307, 317, Anatomy 200, Physiology 312, and 2nd yr. Nursing.  
 Study of needs and interactions with individuals in health care facilities who are experiencing alterations in normal growth, development, and performance.  
 Kisker and Staff.

**406 U 5**  
**Health Directed Nursing Interactions in Health Care Systems II**  
 W. 2 cl., 9 hr. lab.  
 Prereq.: 405 and 2nd yr. Nursing.  
 Study of needs and interactions with individuals in health care facilities who are experiencing alterations in normal growth, development, and performance.  
 Kisker and Staff.

**407 U 5**  
**Health Directed Nursing Interactions in Health Care Systems III**  
 Sp. 2 cl., 9 hrs. lab.  
 Prereq.: 406 and 2nd yr. Nursing.  
 Study of needs and interactions with individuals in health care facilities who are experiencing alterations in normal growth, development, and performance.  
 Kisker and Staff.

**505 U 5**  
**Nursing Transactions with Patients and Families in Crisis**  
 A. 2 cl., 9 hrs. lab.  
 Prereq.: 407, Home Ec. 310, Microbiol. 509, Pharm. 470 and 3rd yr. Nursing.  
 Study and implementation of nursing transactions with patients experiencing acute episodic illness, psychological and physiological stress.

**506 U 5**  
**Nursing Transactions with Patients and Families in Recurring Crises**  
 W. 2 cl., 8 hrs. lab.  
 Prereq.: 505.  
 Study and implementation of nursing transactions with patients and families experiencing long term illness with the goal of reaching the individual's maximum potential.

**507 U 5**  
**Nursing Process with Groups of Patients**  
 Sp. 2 cl., 9 hrs. lab.  
 Prereq.: 506.  
 Study and application of methodologies of organizing and delivering health care to groups of patients in complex health care systems.

**531 U 8**  
**Community Health Nursing**  
 Su, A.  
 Prereq.: 410, 411, 420, and 421; prereq. or concur.: Prev. Med. 585.  
 Study of community health problems and the nursing care of individuals and families in homes, schools, and places of employment. Clark, Ruffing, and Steiner.

**540 U 8**  
**Nursing Study of the Psychiatric Patient**  
 Su, A. 4 cl. and average of 16 hrs. clinical study per wk.  
 Prereq.: 410, 411, 420, and 421.  
 Nursing study of the psychiatric patient as an interpersonal, problem-solving process; (conferences, discussions, and clinical practice).

**552 U 8**  
**The Nursing Process with Groups of Patients**  
 Su, A. 4 cl., 16 hrs. clinical study.  
 Prereq.: Nurs. 4th yr. standing; concur. 553.  
 Not open to students with credit for 550.  
 Study and application of decision-making and concepts of management related to nursing process with groups of patients in the team leader/member role. Polcyn and Staff.

**553 U 7**  
**Care of the Critically Ill Patient**  
 Su, A. 4 cl., 12 hrs. clinical study.  
 Intensive study of the nursing care of critically ill patients with emphasis on synthesis of information to produce a plan that will have desired effects.  
 Buckeridge and Staff.

**560 U 4****History, Trends, and Issues in Nursing**

Su, A, W, Sp. 4 cl.

Prereq.: Nurs. 3rd or 4th yr. standing.

Consideration of social, economic, and cultural forces influencing nursing and nursing education in the United States, 1870 to present with emphasis on 1930 to present; responsibilities and opportunities of the profession.

**593 U 1-8****Individual Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 16 cr. hrs.

Study of selected problems in nursing.

**594 U 1-8****Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 16 cr. hrs.

Group study of selected problems in nursing.

**685 U G 4-7****Field Instruction in Nursing**

Su, A, W. 2 cl., 4 hrs. clinical experience per cr. hr.

Prereq.: Permission of instructor.

The first qtr. of registration in this course must be for 4 cr. hrs.

Application of scientific method of study to selected nursing and teaching problems; includes observation and participation in clinical situation, conferences, library study, field trips, and written reports.

**685.03 Supervision and Administration.****685.04 Teaching.** Pease.**793 U G 1-5****Individual Studies in Nursing**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Reading, conferences, and minor investigation by an individual student who wishes to study a particular nursing problem intensively.

**794 U G 2-5****Group Studies in Nursing**

Su, A, W, Sp.

Prereq.: 4th year Nursing or graduate student.

Repeatable to a maximum of 15 cr. hrs.

Group studies of special problems in nursing; topics vary for quarters.

**797 U G 1-5****Interdepartmental Seminars**

A, W, Sp.

Repeatable by permission of School Secretary.

(See under Interdepartmental Seminars, Course Offerings catalog.)

**801 G 3-6****Concept and Theory Development**

A, Sp. 3 cl.

Repeatable to a maximum of 6 cr. hrs.

Study of concept development and theories and their usefulness for nursing as a practice discipline. King.

**802 G 3****Research in Nursing**

Su, A. 1-3 cl., or up to 4 hr. lab.

Prereq.: Course in basic statistical methods.

Research in nursing and its role in developing nursing; application in nursing of various methodologies and techniques and particular problems of design are considered.

**802.01 Non-experimental Designs**

Su, A. 2 cl., 2 hr. lab.

Prereq. or concur.: Course in basic statistics methods.

Application in nursing of non-experimental approaches of research, pertinent data collection techniques and tools, problems most frequently encountered in designing and conducting non-experimental studies.

**802.02 Inquiry in Nursing**

Su, A. 2 cl., 1 hr. arr.

Prereq. or concur.: Statistics course and/or concurrent 801.

Components of fulfilling man's urge to explain including the scientific method and the ways of testing reality appropriate in the discipline of nursing.

**803 G 3****Nursing of Individuals**

Su, A. 3 cl.

Prereq.: Permission of instructor.

Study of the common core of knowledge in nursing with respect to the personal systems of clients and health care workers; application of this knowledge through the human process. Sills and Staff.

**804 G 3****Nursing of Groups**

A, W. 3 cl.

Prereq.: Permission of instructor.

Study of common core of knowledge in nursing with respect to the interpersonal systems inherent in health care institutions; application to human process. Sills and Staff.

**805 G 3****Nursing Within Communities**

Sp. 3 cl.

Prereq.: Permission of instructor.

Study of the common core of knowledge in nursing with respect to social systems as might be applied in health care systems. Sills and Stevenson.

**806 G 2-10****Nursing Practice Problems**

Su, A, W, Sp. 2 cl., lab. arr.

Prereq.: Permission of instructor and current Ohio license; concur. 803, 804, and 805.

Each decimal subdivision repeatable to 10 cr. hrs.

Studies of nursing care problems pertaining to a variety of client groups; may register for more than one section concurrently.

**806.01 Family Health Care**

Prereq.: Permission of instructor.

Study of the family and the role of the nurse with healthy families. Ryan.

**806.02 Children**

Prereq.: 806.01.

Application of theoretical, conceptual, and affective components needed to conduct inquiry and to practice nursing with children (newborn to six years) and their families. Bellam.

**806.03 Schoolagers and Adolescents**

Prereq.: 806.01.

Application of theoretical, conceptual, and affective components needed to conduct inquiry and to practice nursing with children (schoolage and adolescent) and their families. Kalafatic.

**806.04 Adults**

Prereq.: Permission of instructor.

Study of health problems of adults. Stevenson.

**806.05 Aged**

Prereq.: Permission of instructor.

Study of health problems of the aged. Ryan and Stevenson.

**806.06 Acute Health Crises**

Prereq.: Permission of instructor.

Studies of crisis and crisis intervention with respect to the health-illness continuum. Sils and Staff.

**806.07 Chronic Health Problems**

Prereq. or concur.: 801 and 803.

Studies of chronicity, disability, impairment, and rehabilitation in long-term problems.

**806.08 Community Health Problems**

Prereq. or concur.: 805.

Studies of community, community health problems, and nursing role in identifying and studying these problems. Sils and Staff.

**860 G 3****Theoretical Bases for Leadership Roles in Nursing I**

Su, W. 3 cl. hrs.

Prereq.: 801, 803, 804, 805.

A study of theoretical bases for administrative, teaching, and practice roles in Nursing.

**861 G 3****Theoretical Bases for Leadership Roles in Nursing II**

A, Sp. 3 cl. hrs.

Prereq.: 860.

Continuation of 860.

**862 G 10****Practicum in Nursing**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Supervised experiences which permit in depth study of the roles and relationships in administration, practice, or teaching of nursing.

**862.01 Administration**

Su, A, W, Sp. 2 hr. sem.; field work.

Study of administrative position with opportunity to test theoretical knowledge in a health care system.

**862.02 Primary Care Practitioner**

Su, A. 2 2-hr. cl.; lab.

Supervised experimental component which permits in-depth study of the roles and relationships in the primary care area of practice.

**862.03 Acute Care Practitioner**

A, W. 2 2-hr. cl., lab.

Supervised experimental component which permits in-depth study of the roles and relationships in the acute care area of practice.

**862.04 Long-Term Care Practitioner**

A, Sp. 2 2-hr. cl., lab.

Supervised experimental component which permits in-depth study of the roles and relationships in the long-term area of practice.

**862.05 Teaching in a Baccalaureate Program in Nursing**

Su, A, W, Sp. 2 2-hr. sem.; field.

Supervised experimental component of preparation to teach nursing in a baccalaureate program.

**880 G 2-5****Seminar**

A, W, Sp.

Repeatable to a maximum of 30 cr. hrs.

Discussion of issues, trends, and problems in nursing; topics to be announced.

**994 G 2-5****Group Studies in Nursing**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 5 cr. hrs.

Reading and group conferences for graduate students who desire to study a particular trend in nursing or nursing education.

**999 G Arr.****Research in Nursing**

Su, A, W, Sp.

Research for thesis purposes only.

**Obstetrics and Gynecology**

Office: N-635 University Hospital, 410 West 10th Avenue

**Professors** Copeland (Acting Chairman), Boutsellis, Hollenbeck, Holzaepfel, Meiling, Teteris, and Williams; **Associate Professors** Rigsby, Ruppertsberg, and Stevens; **Assistant Professors** Essig, Lewis, Villalon, Witmer, and Zartman.

**737 P 6 or 12****Clinical Obstetrics and Gynecology**

2 months, offered July, Sept., Nov., Jan., Mar., or May.

Prereq.: Med. 3rd yr. standing.

Must repeat to 12 cr. hrs.

Normal and abnormal obstetrics and diseases of the female generative tract; management and philosophy of current therapy; supervised inpatient and outpatient experience.

**740 P 6****Fetus and Newborn**

1 month, offered Aug., Dec., and May.

Prereq.: Permission of instructor.

Reproduction biology and human development; the fetal-maternal axis and the product of conception; supervised clinical training and service.

**745 P 6****Reproduction Endocrinology and Infertility**

1 month, offered Sept. and Mar.

Prereq.: Permission of instructor.

Selective endocrinologic aspects of the specialty; correlation of biochemical, histochemical and cytologic aspects with clinical problems.

**751 P 6****Obstetric and Gynecologic Specialties**

1 month, offered all months.

Prereq.: Permission of instructor.

Repeatable to a maximum of 18 cr. hrs.

Instruction in the newer and more advanced techniques of diagnosis and therapy which would have been neither feasible nor possible on the wards nor in the clinics.

**751.01 Obstetric Specialties**

**751.02 Gynecologic Specialties**

**793 P 6, 12, 18 G 2-5****Individual Studies in Obstetrics and Gynecology**

1 month, offered all months.

Su, A, W, Sp.

Prereq.: Permission of chairman.

Repeatable to a maximum of 18 cr. hrs. for professional credit.

Clinical, laboratory, conference, and library work in Obstetrics and/or Gynecology.

**793.01 Obstetrics Specialties**

**793.02 Gynecologic Specialties**

**900 G 2-5****Obstetric and Gynecologic Pathology**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 8 cr. hrs.

Laboratory, conference, and library work; study of current pathological specimens with emphasis upon special investigation. Meiling, Hollenbeck, Holzaepfel, Williams, and Boutselis.

**999 G Arr.****Research in Obstetrics and Gynecology**

Su, A, W, Sp.

Research for thesis purposes only.

## Occupational Therapy

(School of Allied Medical Professions)

Office: 406 School of Allied Medical Professions Building, 1583 Perry Street

**Instructor** Grant (Division Director); **Professor** Locher; **Associate Professor** Pennucci; **Assistant Professors** Adamson and Allen; **Instructors** Hartsook and Page; **Clinical Instructors** Cameron, Caprio, Clingan, Dixon, Gill, Hines, Jones, Marco, Sandmann, Sapphire, Shoop, and Snyder.

**311 U 1****Occupational Therapy Orientation**

Su, A. 2 cl.

Prereq.: Registration in Oc. Ther. curriculum.

Not open to students with credit for 201.

The scope of occupational therapy is presented with its relationship to broad fields of education and medicine and to other allied health professions. Johnson, Page, and Grant.

**312 U 2****Occupational Therapy Orientation**

Su, W. 1 cl., 2-hr. lab.

Prereq.: 311.

Not open to students with credit for 202.

Continuation of 311. Johnson.

**313 U 2****Occupational Therapy Orientation**

Su, Sp. 1 cl., 2-hr. lab.

Prereq.: 312.

Not open to students with credit for 203.

Continuation of 312. Page.

**314 U 1****Occupational Therapy**

Su, A, W, Sp. 2-hr. lab.

Prereq.: Admission to Oc. Ther.

Not open to students with 4 cr. hrs. for 204.

Repeatable to a maximum of 4 cr. hrs.

Additional preclinical experiences. Locher.

**411 U 2****Departmental Organization**

A. 2 cl.

Prereq.: Registration in Oc. Ther. curriculum.

Not open to students with credit for 301.

Occupational therapy relationships within the institution and community; a study in program planning based on treatment methods including budgets, equipment, supplies, records, and staffing implications. Adamson.

**503 U 8****Occupational Therapy**

W. 5 cl., 3 2-hr. lab.

Prereq.: 311, 312, 313, 314, Psych. 330 or 331 or 332, or 333, and admission to Oc. Ther.

Not open to students with credit for 404.

Information, discussion, and demonstration of medical problems, and use of activities, self, and groups in the total treatment program of neuropsychiatric and mentally deficient patients. Page and Psychiatric Staff.

**504 U 5****Occupational Therapy**

Sp. 2 cl., 3 2-hr. lab.

Prereq.: Physiol. 311, 312, Phys. Ther. 495, Alli. Med. 530; concur. Alli. Med. 520, and Phys. Ther. 482; and admission to Oc. Ther.

Not open to students with credit for 403.

Evaluation and treatment principles and methods through activity in cases of loss of muscle power, limited joint motion, and amputation. Grant and Staff.

**595 U 1****Occupational Therapy Seminar**

A. 1 cl.

Prereq.: Admission to Oc. Ther.

Not open to students with credit for 415.

Discussion and demonstration of current methods and problems in occupational therapy. Adamson.

**596 U 1****Occupational Therapy Seminar**

W. 1 cl.

Prereq.: 415 or 595.

Not open to students with credit for 416.

Continuation of 595. Grant.

**597 U 1****Occupational Therapy Seminar**

Sp. 1 cl.

Prereq.: 416 or 596.

Not open to students with credit for 417.

Continuation of 596. Page.

**625 U 5****Occupational Therapy**

A. 2 cl., 3 2-hr. labs.

Prereq.: 504.

Not open to students with credit for 405 or 505.

Principles and methods of treatment in cases of lack of coordination; adaptation of equipment to meet activity needs of the individuals so involved. Grant and Staff.

**626 U 2****Occupational Therapy**

A. 2 cl.

Prereq.: 503.

Not open to students with credit for 406 or 506.

Advanced evaluation and treatment procedures of occupational therapy in psychiatry. Page.

**627 U 8****Occupational Therapy**

A. 5 cl., 3 2-hr. labs.

Prereq.: 503 and 504.

Not open to students with credit for 407 or 507.

Medical information correlated with evaluation and treatment procedures for various ages with acute and chronic medical and surgical conditions in the hospital and community setting. Johnson and Medical Staff.

**630 U 6****Clinical Practice in Occupational Therapy**

Su, A, W, Sp.

Prereq.: An average point-hour ratio of 2.25 in all professional courses and permission of divisional director.

Not open to students with 18 cr. hrs. for 420, 520, or 630.

Repeatable to a maximum of 18 cr. hrs.

(Initial registration in this course may come in the su. following the completion of the 6th qtr. of the professional program and may be either for one term or the qtr.

A practical experience in application of the principles and functions of occupational therapy in selected hospitals, rehabilitation centers, day care facilities, and convalescent homes. Adamson.

## Ophthalmology

Office: 403 Means Hall, 466 West 10th Avenue

**Professors** Havener (Chairman), Blackwell, Keates, Magnuson, Makley, and Perry (Emeritus); **Associate Professors** Andrew, Battles, Biersdorf, Bitonte, Bredemeyer, Kapetansky, Moses, Quinn, Suie, and Wachtel; **Assistant Professors** Barton, Bontley, Burns, Craig, Davidorf, de la Motte, Higbee, Letson, Lubow, O'dair, Olson, Sage, Simmons, and Stine.

**751 P 1****Group Studies in Ophthalmology**

1 month, offered Oct. and Feb.

Prereq.: Enrollment in College of Medicine for a Doctor of Medicine degree.

Fundamentals of ophthalmology applicable in general practice and in other medical specialties. Makley.

**793 P 6, 12, 18 G 1-5****Individual Studies in Ophthalmology**

1, 2 or 3 months; offered all months.

Su, A, W, Sp.

Prereq.: Permission of chairman.

Repeatable to a maximum of 18 cr. hrs.

Research in the area of:

**793.01 Ophthalmic Microbiology**

**793.02 Ophthalmic Immunology**

**793.03 Ophthalmic Pathology**

**793.04 Retinal Diseases**

**794 P 6, 12, 18****Group Studies in Ophthalmology**

1 month, offered all months except July.

Prereq.: Permission of instructor.

Repeatable to a maximum of 18 cr. hrs.

Clinical experience in basic ophthalmology to include rotations through the outpatient service and eye ward, conferences, and rounds.

**850 G 3-5**  
**Seminar in Ophthalmology**

A, W, Sp.

Prereq.: Permission of instructor.

Each student is responsible for presenting material at least twice a year; attendance at weekly Grand Round on the Ophthalmology service is included.

**999 G Arr.**  
**Research in Ophthalmology**

Su, A, W, Sp.

Research for thesis purposes only.

## Optometry

Office: 111 Optometry Building, 338 West 10th Avenue

**Professors** Hebbard (Dean), Fry, and Hill; **Associate Professors** Bailey and Mote; **Assistant Professors** Albright, Baillie, Brannon, Carifa, Fugate, Goldschmidt, Haines (Emeritus), Jones, V. King, Lowther, Saladin, Schoessler, and Zinnecker; **Instructors** Augsburg, Beiter, Bowers, George, Hicks, Lee, Michaels, Polasky, Pratte, Quelette, Reardon, Runyan, C. Uniacke, N. Uniacke, and Walby.

**401 P 1**  
**Survey of Optometry**

A. 1 cl.

Prereq.: Optom. 1st yr. standing.

Development of optometry and optometric education; scope of optometric services; sources of vision information; kinds of current vision research.

**411 P 3**  
**Intermediate Geometric Optics**

Sp. 3 cl.

Prereq.: Optom. 1st yr. standing and Physics 435.

Thick-lens optics; image evaluation; application to optometric systems.

**431 P 5**  
**Ophthalmic Optics I**

W. 4 cl., 1 2-hr. lab.

Prereq.: Optom. 2nd yr. standing and 411.

Ophthalmic optics of single-vision and multifocal spectacle lenses; measurement and inspection of spectacle lenses; manufacturing processes.

**432 P 5**  
**Ophthalmic Optics II**

Sp. 4 cl., 1 2-hr. lab.

Prereq.: 431.

Ophthalmic lens design; minimizing lens aberrations; theory and practice in fitting and adjusting spectacles.

**433 P 4**  
**Ophthalmic Optics III**

A. 3 cl., 1 2-hr. lab.

Prereq.: 432.

The optics of corneal and scleral contact lenses; laboratory exercises in inspecting, measuring, edging, surfacing, and modifying contact lenses.

**441 P 4**  
**Practical Optometry I**

A. 3 cl., 1 3-hr. lab.

Prereq.: Optom. 2nd yr. standing, Phys. 112, and Math. 150.

Theory and techniques of keratometry, skiametry, objective and subjective tests of refraction, accommodation, and functions of the extra-ocular muscles.

**442 P 4**  
**Practical Optometry II**

W. 3 cl., 1 3-hr. lab.

Prereq.: 441.

Correlation and analysis of data; systematic determination of the etiology of anomalies and sources of visual discomfort and inefficiency; corrective procedures and prescription writing.

**443 P 4**  
**Practical Optometry III**

Sp. 3 cl., 1 3-hr. lab.

Prereq.: 442.

Ophthalmoscopy and examination of the external parts and the media of the eye; case histories; techniques of investigating special types of anomalies; corrective procedures.

**641 P 5**  
**Clinical Practice in Optometry I**

Su, A, W, Sp. 2 cl., 3 3-hr. lab.

Prereq.: 443.

Clinical practice in examining eyes and carrying out corrective procedures; the conference periods are devoted to the discussion of problems encountered during the clinic periods.

**642 P 5**  
**Clinical Practice in Optometry II**

Su, A, W, Sp. 2 cl., 3 3-hr. lab.

Prereq.: 641.

Continuation of 641.

**643 P 5**  
**Clinical Practice in Optometry III**

Su, A, W, Sp. 2 cl., 3 3-hr. lab.

Prereq.: 642.

Continuation of 642.

**651 P 4**  
**Orthoptics**

W. 3 cl., 1 2-hr. lab.

Prereq.: Optom. 3rd yr. standing and 443.

Definitions, characteristics, incidence, and phenomenology of visual problems producing loss or inefficiency of binocular vision; diagnosis, prognosis, and orthoptic treatment of such problems.

**652 P 4**  
**Aniseikonia and Low Vision**

Sp. 3 cl., 1 2-hr. lab.

Prereq.: Optom. 3rd. yr. standing and 443.



Etiology; clinical methods of evaluating aniseikonia and low vision; design of optical aids for such conditions; environmental aids and agencies available to the visually handicapped.

**653 P 4**

**Contact Lenses I**

W. 3 cl., 1 2-hr. lab.

Prereq.: Optom. 3rd. yr. standing and 443.

The uses of contact lenses; theory and methods of fitting; specification and verification; post-fitting care; contact lens solutions.

**654 P 4**

**Contact Lenses II**

Sp. 3 cl., 1 2-hr. lab.

Prereq.: Optom. 653.

Theory and clinical methods involving meridional and bifocal contact lenses; fitting astigmatic corneas and aphakic eyes; haptic and keratoconic lenses; cosmetic shells and prosthetic eyes.

**660 P 5**

**Ophthalmic Pathology**

A. 3 cl., 6 lab. hrs.

Prereq.: Optom. 2nd yr. standing, Path. 650.

Gross and microscopic pathology of the eye, including diseases of the conjunctiva, orbital cavity, and pertinent pathology of the central nervous system.

**701 P 4**

**Applied Pathology of the Eye I**

Sp. 3 cl., 1 2-hr. lab.

Prereq.: 443 and Physiol. Opt. 608.

Advanced ophthalmoscopy, slit lamp microscopy, tonometry, and other methods of detecting pathological conditions; systematic study of ocular diseases; artificial eyes and other prosthetic devices.

**702 P 4**

**Applied Pathology of the Eye II**

A. 3 cl., 1 2-hr. lab.

Prereq.: 701.

Motor disturbances of eyes, paralytic strabismus, peripheral fixation anomalies, nystagmus, ptosis, ptosis crutches, anomalous accommodative and pupillary responses.

**703 P 4**

**Applied Pathology of the Eye III**

A. 3 cl., 1 2-hr. lab.

Prereq.: 702.

Visual fields; scotometry; subnormal central vision involving pathology; telescopic lenses and aids for subnormal vision; theory and practice in the use of contact lenses.

**721 P 3**

**Optometric Economics and Jurisprudence**

W. 3 cl.

Prereq.: 643.

Historical background; legal status; practice building techniques; office accounting and general practice management; representative organization in optometry; professional ethics.

**722 P 3**

**Civic and National Problems in Eye Care**

Sp. 3 cl.

Prereq.: 721.

Number, distribution, supply interrelationships, and roles of the various ophthalmic groups; prevalence of visual anomalies; governmental and public-health aspects of vision care.

**741 P 8**

**Advanced Clinical Practice in Optometry I**

A, W, Sp. 2 cl., 18 hrs. lab.

Prereq.: 643.

Advanced clinical practice; the conference periods are devoted to the discussion of problems and cases encountered during the clinic periods.

**742 P 8**

**Advanced Clinical Practice in Optometry II**

A, W, Sp. 2 cl., 18 hrs. lab.

Prereq.: Optom. 4th yr. standing and 741.

Continuation of 741.

**743 P 8**

**Advanced Clinical Practice in Optometry III**

A, W, Sp. 2 cl., 18 hrs. lab.

Prereq.: Optom. 4th yr. standing and 742.

Continuation of 742.

**745 P 3-5**

**Special Clinical Practice**

Su, A, W, Sp. 1 cl., 2-4 3-hr. lab.

Prereq.: 443; concur. 641 and permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Clinical experience in specialized phases of optometric practice, (a) subnormal vision, (b) aniseikonia, (c) vision in schools and industry, (d) orthoptics; and (e) contact lenses.

## Otolaryngology

Office: N-820 University Hospital, 410 West 10th Avenue

**Professors** Saunders (Chairman) and Birk; **Associate Professors** Arthur, Lim, Melnick, Miller, and Smith; **Assistant Professors** Kelly, Lowery, Miglets, Nilo, Stockwell, VerMeulen, and Wagenbrenner.

**720 P G 3**

**Otolaryngology-Surgical Aspects of the Anatomy of the Head and Neck I**

A. 3 cl.

Prereq.: Permission of instructor.

Not open to students with 6 cr. hrs. for 820.

Must repeat to 6 cr. hrs.

Dissection of the head and neck with lectures and demonstrations of anatomical aspects especially of surgical interest to the otolaryngologist. Saunders and Birk.

**721 P G 3****Otolaryngology-Surgical Aspects of the Anatomy of the Head and Neck II**

W. 3 cl.

Prereq.: 720 and permission of instructor.

Continuation of 720. Saunders and Birck.

**750****Seminar in Otolaryngology**

A, W, Sp.

Prereq.: Permission of instructor.

**750.01 Otopathology****P G 1**

W. 2 cl.

Not open to students with 2 cr. hrs. for 850.01

Must repeat to 2 cr. hrs.

Miglets and Lim.

**750.02 General Otolaryngological Pathology****P G 1**

Sp. 2 cl.

Not open to students with 2 cr. hrs. for 850.02

Must repeat to 2 cr. hrs.

Saunders.

**750.03 Bioacoustics****P G 2**

Sp. 2 cl.

Not open to students with credit for 850.03.

Repeatable to a maximum of 4 cr. hrs.

Melnick.

**750.04 Audiological Considerations in Otolaryngology****P G 2**

A. 2 cl.

Not open to students with credit for 850.04.

Repeatable to a maximum of 4 cr. hrs.

Nilo.

**751 P 1****Special Group Studies in Otolaryngology**

1 month offered Oct. and Feb.

Prereq.: Enrollment in College of Medicine for a Doctor of Medicine degree.

Clinical work in basic otolaryngology as encountered in general practice and other medical specialty practice.

**793 P 6, 12, 18 G 2-5****Individual Studies in Otolaryngology**

1, 2, or 3 months; offered all months.

Prereq.: Permission of instructor.

Repeatable to a maximum of 18 cr. hrs.

Research problems in otolaryngology involving work in animal laboratory, temporal bone laboratory, audiology section and library; scheduled seminars and grand rounds, but no routine patient care.

**794 P 6****Group Studies in Otolaryngology**

1 month, offered all months except June.

Prereq.: Permission of instructor.

Clinical application of the principles of otolaryngology with patients in clinic and operating room; at least one hour daily supervised teaching by staff members; instruction by slides, films, seminars, and personal supervision. Saunders and Staff.

**999 G Arr.****Research in Otolaryngology**

Su, A, W, Sp.

Research for thesis purposes only.

**Pathology**

Office: 4170 Graves Hall, 333 West 10th Avenue

**Professors** Macpherson (Acting Chairman), Cole, Geer, Holaday, Koestner, Liss, Newton, Stevenson, and von Haam; **Associate Professors** Assor, Baba, Davis, Grannis, Gruemer, Hurd, Johansmann, Lott, Lowy, Miller, Newman, Old, Reiner, and Smetters; **Assistant Professors** Ayers, Bishop, Cavalaris, Clausen, Craig, Davidson, Cogate, Hamoudi, Harsh, Kirkham, Murthy, Palileo, Roth, Sharma, Thorne, von der Hoeven, and Vaughn.

**501 U 3****Medical Technology**

Su. 3 cl.

Prereq.: Admission to Med. Tech. or permission of instructor.

Clinical hematology, including coagulation; urinalysis. Stevenson.

**502 U 3****Medical Technology**

A. 3 cl.

Prereq.: Admission to Med. Tech. or permission of instructor.

Clinical microbiology, including mycology. Ayers.

**503 U 3****Medical Technology**

W. 3 cl.

Prereq.: Admission to Med. Tech. or permission of instructor.

Immunology; immunohematology. Macpherson.

**504 U 5****Medical Technology**

Sp. 5 cl.

Prereq.: Admission to Med. Tech. or permission of instructor.

Clinical blood and tissue chemistry; modes of investigating diseases by biochemical methods, and their interpretation. Gruemer and Staff.

**505 U 3****Fundamentals of Disease**

A. 3 cl.

Prereq.: Admission to School of Allied Medical Professions or permission of instructor.

The nature of disease, mechanisms involved in the disease process, and use of the laboratory in defining the mechanisms of disease. Macpherson and Staff.

**603****Clinical Pathology**W. 4 cl., 2 2-hr. lab. **P 6**W. 4 cl. **G 4**

Prereq.: For professional credit, Med. 2nd yr. standing; for grad. credit, permission of instructor.

A study of the changes in the blood, urine, feces, sputum, spinal fluid, and gastric contents brought about by disease. Macpherson and Stevenson.

**624† P G 7****General Pathology**

A. 5 cl., 3 2-hr. lab.

Prereq.: For professional credit, enrollment in College of Medicine for a Doctor of Medicine degree, for grad credit, permission of instructor.

Degenerative, circulatory, inflammatory, and neoplastic lesions; reactions to injury; pathology of infectious diseases.

**625† P G 4****Special Pathology**

W. 2 cl., 2 2-hr. lab.

Prereq.: 624.

The pathology of the heart and blood vessels; the respiratory tract; the bone marrow, spleen, and lymph nodes; the gastrointestinal tract; the liver, biliary tract, and pancreas.

**626† P G 4****Special Pathology**

Sp. 2 cl., 2 2-hr. lab.

Prereq.: 624.

Pathology of the urinary tract; the male and female genital organs; the endocrine glands, the central nervous system; the bones, muscles, and skin.

**640 P G 3****Pathobiology**

A. 3 cl.

Prereq.: Permission of instructor.

(Cross-listed in the Dept. of Vet. Path.)

Seminars on topics in comparative cellular pathology.

**650 P G 5****Pathology**

A. 3 cl., 6 lab. hrs.

Prereq.: Optom. 2nd yr. standing or permission of instructor.

General pathology including the etiology of infectious disease, disturbances of nutrition, inflammation, and neoplasia, with special reference to the influence upon ophthalmic pathology; selected chapters of Special Pathology; histologic and gross demonstrations.

**655 P 5****General Pathology**

Sp. 3 cl., 2 3-hr. lab.

Prereq.: Dent. 2nd yr. standing.

General pathology, including the etiology of diseases, disturbances of nutrition, inflammation, regeneration, and tumors.

**792 P G 3****Special Lectures in Pathology**

Su, A, W, Sp. 3 cl.

Prereq.: Grad. standing; enrollment in College of Medicine for Doctor of Medicine degree.

Repeatable to a maximum of 24 cr. hrs.

Lectures in special fields of pathology; one decimal subdivision will be offered each quarter.

**792.01 Blood and Bone Marrow I**

Pathology of the blood and bone marrow with emphasis on the laboratory diagnosis of anemia. Stevenson.

**792.02 Lectures in Clinical Chemistry**

The metabolic basis of disease, interpretation of laboratory data, and clinical laboratory methodology. Gruemer and Staff.

**792.04 Neuropathology**

Selected lectures on neuropathology. Liss.

**792.05 Immunoematology**

Diagnostic laboratory methods in immunoematology. Macpherson.

**792.06 Exfoliative Cytology**

Diagnostic exfoliative cytology including aspiration biopsy. von Haam.

**792.08 Cellular Pathology I**

Cellular pathology with emphasis on ultramicroscopic changes in cell injury.

**792.09 Cellular Pathology II**

Cellular pathology with emphasis on technical basis and alterations in cell organelles.

**792.10 Blood and Bone Marrow II**

Pathology of the blood and bone marrow with emphasis on the non-erythroid elements.

**792.11 Automation and Instrumentation in Clinical Chemistry**

Advanced analytical technique as applied to clinical chemical problems. Discussion of spectrophotometric, electronanalytic, clinomatographic and other methods in the context of the clinical laboratory. Theory and application of automated analysis.

**793 P G 3-6, 12, 18****Individual Studies in Pathology**

1, 2, or 3 months; offered all months.

Su, A, W, Sp.

Prereq.: Med. Phase IV standing, or graduate standing; permission of instructor.

(When registration is for 3 professional credit hours, an additional 3 hr. professional course must be taken.)

**793.01 Pathologic Anatomy**

May repeat to 18 cr. hrs.

**793.02 Principles of Clinical Cytology**

May repeat to 18 cr. hrs.

**793.04 Clinical Chemistry**

May repeat to 18 cr. hrs.

Gruemer.

**793.05 Neuropathology**

May repeat to 18 cr. hrs.

Liss.

**793.06 Immunoematology**

May repeat to 18 cr. hrs.

Macpherson.

**793.07 Clinical Microbiology**

May repeat to 18 cr. hrs.

Ayers.

**793.08 Pediatric Pathology**

May repeat to 18 cr. hrs.

Newton.

**793.09 Surgical Pathology I**

May repeat to 18 cr. hrs.

Holaday.

**793.10 Surgical Pathology II**

May repeat to 18 cr. hrs.  
Holaday.

**793.11 Special Topics in Pathologic Anatomy**

May repeat to 18 cr. hrs.

**793.12 Ultrastructure of Cells in Disease**

May repeat to 18 cr. hrs.

**793.13 Laboratory Medicine—the Erythrocyte**

May repeat to 18 cr. hrs.  
Stevenson.

**793.14 Problems in Experimental Pathology**

May repeat to 18 cr. hrs.  
von Haam.

**793.15 Problems in Pathology and Clinical Pathology**

May repeat to 18 cr. hrs.

**850 G 2****Seminar in Pathology and Clinical Pathology**

Su, A, W, Sp. 1 2-hr. cl.

Prereq.: Grad. standing in Path.

Discussion of pertinent literature, presentation and discussion of research work, and demonstration of fresh specimens and slides.

**999 G Arr.****Research in Pathology**

Su, A, W, Sp.

Research for thesis or dissertation purposes only.

## Pediatrics

Offices: Children's Hospital, 561 South 17th Street and N-118 University Hospital, 410 West 10th Avenue

**Professors** Graham (Chairman), Allen, Ambuel, Coddington, Cramblett, Hamparian, Hosier, Kontras, Meites, Newton, Owen, Rie, Shaffer, Sherard, Somerson, Sotos, and Turner; **Associate Professors** Addanki, Cordero, Eaton, I. Ertel, P. Ertel, Haynes, Helper, Naylor, Paulson, Reiner, and Ruppert; **Assistant Professors** Arnold, Azimi, Burton, Craenen, Hock, Leaverton, Pollack, Romshe, Sommer, Thomas, Wehe, Woo-Ming, and Young; **Instructors** Freno, Garry, Geltner, Haque.

**715 P 6 or 12****Clinical Pediatrics**

2 months.

Prereq.: Med. 3rd yr. standing.

Must repeat to 12 cr. hrs.

Didactic and clinical instruction in pediatrics; presentation of health care of sick and well children.

**793****Individual Studies in Pediatrics**

Su, A, W, Sp.

1, 2, 3, or 4 months.

Prereq.: Permission of instructor.

**793.01 Advanced Pediatrics**

P 6, 12, 18  
G 1-5

1, 2, 3, or 4 months; offered all months except June.

Repeatable to a maximum of 24 cr. hrs. for professional credit.

Graham.

**793.02 Genetics**

P 6, 12, 18  
G 1-5

1, 2, or 3 months; offered all months.

Repeatable to a maximum of 18 cr. hrs. for professional credit.

Kontras.

**793.03 Infectious Diseases**

P 6, 12, 18  
G 1-5

1, 2, 3, or 4 months; offered all months except Jan., Feb., and Mar.

Repeatable to a maximum of 24 cr. hrs. for professional credit.

Cramblett.

**793.04 Pediatric Cardiology**

P 6, 12, 18  
G 1-5

1, 2, or 3 months; offered all months except June and Dec.

Repeatable to a maximum of 18 cr. hrs. for professional credit.

Hosier.

**793.05 Child Development**

P 6, 12, 18  
G 1-5

2, 3, or 4 months; offered all months except June.

Prereq.: Permission of instructor.

Repeatable to a maximum of 24 cr. hrs. for professional credit.

Students will undertake investigative study of normal and abnormal development in children and will conduct, under faculty supervision, a research problem; developmental theory and techniques for diagnosis of neuropsychological development in infancy. Wehe.

**793.06 Blood Diseases of Infants and Children**

P 6  
G 1-5

1 month, offered all months except June.

Newton.

**793.07 Neonatal Research**

P 6, 12, 18

1, 2, 3, or 4 months; offered all months except June.

Repeatable to a maximum of 24 cr. hrs. for professional credit.

Cordero.

**793.08 Adolescent Medicine**

P 6, 12, 18  
G 1-5

1, 2, or 3 months; offered all months.

Repeatable to a maximum of 18 cr. hrs. for professional credit.

Shaffer.

**793.09 Pediatric Endocrinology**

P 6, 12, 18  
G 1-5

2-4 mos.; offered all months except July and August.

Repeatable to a maximum of 24 cr. hrs. for professional credit.

Sotos.

**793.10 Pulmonary Diseases**

P 6, 12, 18  
G 1-5

1, 2 or 3 months; offered all months except June.

Repeatable to a maximum of 24 cr. hrs. for professional credit.

Young.

**793.11 Handicapped Child** P 6, 12, 18  
G 1-5

1, 2, or 3 mos.; offered all months except July and August.

Repeatable to a maximum of 18 cr. hrs. for professional credit.

Ambuel.

**793.12 Pediatric Practice** P 6

1 month, offered all months except June.  
Turner.

**793.15 Newborn Care** P 6, 12, 18

1, 2, 3, or 4 months; offered all months.

Repeatable to a maximum of 24 cr. hrs.  
Cordero.

**793.16 Mental Retardation Training** P 6, 12, 18  
G 1-5

1, 2, or 3 months; offered all months except June and August.

Prereq.: Permission of instructor.

Repeatable to a maximum of 24 cr. hrs.

Woo-Ming.

**793.17 Ambulatory and Community Pediatrics** P 3-6

Offered all months.

Prereq.: Permission of instructor and registered as a student in the College of Medicine.

Repeatable to a maximum of 12 cr. hrs.

The student will study—in depth—a single problem related to community pediatrics, such as the study of an individual disease, socio-economic factors, etc. Ambuel.

**793.18 Pediatric Neurology** P 6-12

Offered all months except August.

Prereq.: Permission of instructor.

Repeatable to a maximum of 12 cr. hrs.

Students participate in inpatient and outpatient activities—including consulting with radiology, physical medicine, electroencephalography, and child development on neurological problems. Sherard.

**793.19 Adolescent Medicine—School Health** P 6

1 month; offered all months except June, July, Aug., and Dec.

Prereq.: Enrollment in the College of Medicine, and permission of instructor.

Orientation to growth and development, psychological characteristics of adolescents; supervised participation in community health programs including school health clinics. Eberly.

**793.20 Adolescent Medicine—Sports Medicine** P 6

1 month; offered all months except June and July.

Prereq.: Enrollment in the College of Medicine and permission of instructor.

Introduction to adolescent psychological, social and medical problems; participation in prevention, diagnosis, and treatment of sports injuries in school and university settings. Shaffer.

**793.21 Adolescent Medicine—Youth and Drugs** P 6

1 month; offered all months.

Prereq.: Enrollment in the College of Medicine and permission of instructor.

Supervised student experiences with youthful drug abuse and its management in the community setting. Stephenson.

**794****Group Studies in Pediatrics**

Su, A, W, Sp.

1, 2, 3, or 4 months.

**794.01 Advanced Pediatric Problems** P 6, 12, 18

1, 2, or 3 months; offered all months except June.

Prereq.: 715.

Repeatable to a maximum of 18 cr. hrs.

Graham.

**794.02 Ambulatory Pediatrics** P 6, 12, 18

1, 2, 3, or 4 months; offered all months except June.

Prereq.: 3rd or 4th yr. standing.

Repeatable to a maximum of 24 cr. hrs.

Ambuel.

**794.03 Inpatient Pediatrics** P 6, 12, 18

1, 2, 3, or 4 months; offered all months except June.

Prereq.: 3rd or 4th yr. standing.

Repeatable to a maximum of 24 cr. hrs.

Graham and Staff.

**794.04 Pediatric Cardiology** P 6

1 month; offered all months except June and Dec.

Prereq.: 3rd or 4th yr. standing.

Hosier.

**794.05 Pediatric Endocrinology and Metabolism** P 6, 12, 18

1, 2, 3, or 4 months; offered all months except July and Aug.

Prereq.: 3rd or 4th yr. standing.

Repeatable to a maximum of 24 cr. hrs.

Sotos.

**794.06 Pediatric Hematology** P 6

1 month; offered all months except June.

Prereq.: 3rd or 4th yr. standing.

Newton.

**794.07 Adolescent Medicine** P 6, 12, 18

1, 2, 3, or 4 months; offered all months.

Prereq.: 715.

Repeatable to a maximum of 24 cr. hrs.

Shaffer.

**794.08 Rheumatology and Handicapped Child** P 6, 12, 18

1, 2, 3, or 4 months; offered all months.

Prereq.: 3rd or 4th yr. standing.

Repeatable to a maximum of 24 cr. hrs.

Bass.

**797****P 3****Interdisciplinary Seminars in Family-Social Medicine**

Su, A, W, Sp. Seminars—50%; Family Contact—50%.

Prereq.: Student registered in College of Medicine and permission of instructor.

Limited to 30 students.

Repeatable to a maximum of 6 cr. hrs.

**830****G 3****Pediatrics for Dental Graduates**

2 months; offered Mar. and Apr.

Prereq.: Grad. standing.

Part of the graduate program in pedodontics; includes general clinical pediatrics presented by lectures, clinical conferences, case presentations, and seminars.

850 G 3-5

**Seminar in Pediatrics**

Su, A, W, Sp.

Prereq.: Permission of dept. chairman.

999 G Arr.

**Research in Pediatrics**

Su, A, W, Sp.

Research for thesis purposes only.

## Petroleum Engineering

(See Chemical Engineering)

Office: 335 Chemical Engineering Building, 140 West 19th Avenue.

Associate Professor Slider.

## Pharmacology

Office: 5086 Graves Hall, 333 West 10th Avenue

Professors Marks (Chairman), Goldman, Hollander, O'Neill, and Truitt; Associate Professors Couri, Dutta, and Fischer; Assistant Professors Engelman, Knowlton, and Lindower; Instructors Tesi, Walker, Tjioe, and Sakai.

600 U G 3

**General Pharmacology**

Sp. 2 cl., 1 3-hr. lab.

Prereq.: Physiol. Chem. 611, Physiol. 601, or permission of instructor.

Introduction to the general principles of pharmacology, drug classification, and the sites and mechanisms of drug action. Dutta.

610 U G 3

**Toxicology and Drug Identification**

W. 1 cl., 2 3-hr. lab.

Prereq.: 600.

The biochemical basis for the action of poisons and methods for the identification of drugs and their metabolites. Couri.

700 P G 4

**Medical and Mammalian Pharmacology**

W. 4 cl.

Prereq.: 600 or permission of instructor.

General principles of pharmacology; drugs used for diagnosis, prevention or eradication of the cause of disease, including endocrine products and chemotherapeutic agents. Marks.

701 P G 5

**Medical and Mammalian Pharmacology**

Sp. 4 cl., 3 lab. hrs.

Prereq.: 700.

Continuation of 700.

702 P G 5

**Practice of Pharmacology**

Sp.

Prereq. or concur.: 701.

Performance and application of specialized pharmacological techniques and methods in evaluation of pharmacodynamic and pharmacokinetic activity of chemical substances.

770 P 3

**Clinical Pharmacology and Therapeutics**

May.

Prereq.: Permission of instructor.

Application of clinical pharmacologic principles to the treatment of disease states. Tesi and Engelman.

793

**Individual Studies in Pharmacology**

1, 2, 3, months; offered all months except June.

P 6, 12, 18

Su, A, W, Sp.

G 3-15

Prereq.: Permission of instructor.

Repeatable to a maximum of 30 cr. hrs.

Cardiac arrhythmias; digitalis pharmacodynamics; neuropharmacology; endocrine pharmacology; advanced cardiovascular pharmacology; autonomic pharmacology.

797 U P G 1-5

**Interdepartmental Seminar**

Su, A, W, Sp.

(See under Interdepartmental Seminars.)

a. Neuroscience.

820†\* G 3-15

**Autonomic Pharmacology**

A. 2 cl., lab. arr.

Prereq.: 701 or permission of instructor.

Not open to students with credit for 720.

Comprehensive review of drugs that mimic or affect the actions of autonomic neurones with emphasis on biochemical and cellular analysis of autonomic drug action. Marks.

821†\* G 3-15

**Cardiovascular Pharmacology**

W. 2 cl., lab. arr.

Prereq.: 701 or permission of instructor.

Not open to students with credit for 721.

Modern concepts of the action of drugs on the heart and circulation. Dutta.

822\* G 3-15

**Neuroendocrine Pharmacology**

Sp. 2 cl., lab. arr.

Prereq.: 600 or 701.

Not open to students with credit for 722.

Levels of interaction of the nervous and endocrine systems. Goldman.

**823 G 3-15**

**Pharmacology Related to Anesthesia**

Su. 2 cl., lab. arr.

Prereq.: 701 or permission of instructor.

Not open to students with credit for 723.

The pharmacodynamics of anesthetic agents and of other drugs which modify the state of surgical anesthesia. Gardier.

**824\* G 3**

**Psychopharmacology**

W. 2 cl. arr.

Prereq.: 600, 701, or permission of instructor.

Psychotropic drug-induced changes in central nervous system activity in relation to the varieties of perceptual-behavioral interpretations of that activity by self-referential systems, i.e. men.

**845 G 5-15**

**Bioelectric Potentials**

W. 5 cl., lab. arr.

Prereq.: Physiol. 601, 602 or equiv. or permission of instructor.

Not open to students with credit for 745.

Methods of recording transmembrane potentials from cells; interpretation of cell potentials; effects of drugs on transmembrane potentials. Hollander.

**850 G 2**

**Seminar in Pharmacology**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Conferences on selected topics in pharmacology.

**851\* G 3-15**

**Steroid Pharmacology**

Sp. 2 cl., lab. arr.

Prereq.: 701 or permission of instructor.

Not open to students with credit for 751.

Pharmacology of steroids which affect special tissues, organs, or systems.

**852†\* G 3**

**Drug Metabolism**

A. 2 cl. arr.

Prereq.: 600 or 701 or permission of instructor.

Not open to students with credit for 752.

Discussions of mechanisms of biotransformation of drugs by enzymes, pharmacologic characteristics of these systems, and techniques for the study of drug metabolism. Couri.

**999 G Arr.**

**Research in Pharmacology**

Su, A, W, Sp.

Research for thesis or dissertation purposes only.

## Pharmacy

Office: 217 College of Pharmacy Building, 500 West 12th Avenue

**Professors** Parks (Dean), Beal, Bope, Burkman, Doskotch, LaPidus, Malspeis, Mitscher, Nelson, Notari, Patil, Rucker, Witiak, and Wolf; **Associate Professors** Hudspeth, Latiolais, Olson, Salisbury, Sokoloski, and Visconti; **Assistant Professors** Anderson, Baldwin, Boxenbaum, Buerki, Feller, Frank, Gerald, Hensel, Krautheim, Lewis, D. Miller, W. Miller, Rahwan, Reuning, Schwirian, and Shaver; **Instructors** Bonacci, Burt, R. Fudge, Huffman, Krause, Mitchell, Prisco, Riffie, Sagraves, and Umstead; **Clinical Instructors** Bystrom, K. Fudge, Hipple, Schneider, and Sherrin.

The areas of instruction and the courses in the College of Pharmacy comprising these areas are listed below:

**ADMINISTRATIVE AND SOCIAL SCIENCES IN PHARMACY**—200, 400, 511, 512, 520, 523, 524, 525, 614, 625, 693, 694, 695, 820, 825, 826, 850, 993, 994, 999.

**CLINICAL PHARMACY AND PROFESSIONAL PRACTICE**—475, 515, 610, 611, 615, 693, 694, 695, 705, 715, 717, 816, 817, 850, 993, 994, 999.

**MEDICINAL CHEMISTRY**—433, 434, 435, 436, 670, 673, 676, 679, 693, 694, 737, 835, 836, 845, 850, 993, 994, 999.

**PHARMACEUTICS AND PHARMACEUTICAL CHEMISTRY**—401, 402, 503, 504, 505, 507, 508, 509, 601, 606, 609, 693, 694, 695, 700, 705, 710, 805, 806, 809, 811, 812, 850, 993, 994, 999.

**PHARMACOGNOSY AND NATURAL PRODUCTS CHEMISTRY**—435, 450, 451, 553, 577, 693, 694, 754, 789, 850, 851, 852, 855, 993, 994, 999.

**PHARMACOLOGY**—270, 470, 613, 670, 673, 676, 677, 679, 680, 681, 693, 694, 850, 870, 871, 872, 880, 881, 993, 994, 999.

**200 U 3**

**The Rational and Irrational Use of Drugs**

Su, A, W, Sp. 3 cl.

Not open for credit to students in the College of Pharmacy.

Survey of the fundamentals of drug action with special emphasis on drugs of abuse; discussion of medical, social, legal, and educational aspects of drug use. Nelson, Gerald, and Salisbury.

**270 U 5**

**Introduction to Drug Action**

W. 3 1½-hr. cl.

Prereq.: Biol. 101 or Zool. 101.

Not open for credit to students in the College of Pharmacy or the School of Nursing.

An introduction to drug action in the treatment of disease; commonly used and abused prescription and non-prescription products will be discussed. Gerald.

**400 P 3**

**Introduction to Pharmacy**

A. 4 cl.

A survey of the profession of pharmacy dealing with pharmacy's place in the health care system, its history, educational requirements, organization, regulation, and current development.

**401 P 5****Pharmaceutics I**

W. 3 cl., 2 hrs. rec., 1 3-hr. lab.

Prereq.: Chem. 242 and 246 or equiv.

The application of physical chemical principles to pharmaceutics: a fundamental introduction to solid and liquid dosage forms. Malspeis, Boxenbaum, and Sokoloski.

**402 P 5****Pharmaceutics II**

Sp. 3 cl., 1 3-hr. lab.

Prereq.: 401.

The application of physical chemical principles to pharmaceutics: properties of solutions of pharmaceutical and medicinal compounds. Reuning and Sokoloski.

**433 P 3****Medicinal Chemistry**

A, Sp. 3 cl., 1 hr. rec.

Prereq.: Chem. 242 or equiv.

An introduction to the chemistry of biologically active organic compounds; discussion of the synthesis, chemical properties and stereochemistry of compounds in major therapeutic classes. LaPidus, Lewis, Miller, and Witiak.

**434 P 5****Introductory Pharmaceutical Analysis**

A. 3 cl., 2 3-hr. lab.

Prereq.: Chem. 242 and 246 or equiv.

An introduction to the quantitative chemical analysis of pharmaceuticals. Olson.

**435 P 5****Bio-Pharmacy**

Sp. 4 cl., 1-hr. rec., 1 3-hr. lab.

Prereq.: Chem. 242 and 246 or equiv.

A study of pharmaceutical agents important in biochemical processes. Bope, Doskotch, and Mitscher.

**436 P 3****Advanced Pharmaceutical Analysis**

W. 1 cl., 2 3-hr. lab.

Prereq.: 434 or equiv.

An introduction to selected instrumental methods of pharmaceutical analysis. Olson.

**450 P 4****Pharmacognosy**

W. 4 cl.

Prereq.: Chem. 242 and 246 or equiv.

A study of the history, source, identification, constituents, and medicinal preparations of some of the more important drugs of biological origin. Beal, Doskotch, and Mitscher.

**451 P 5****Pharmacognosy**

A. 4 cl., 1 3-hr. lab.

Prereq.: Chem. 242 and 246 or equiv.

A continuation of 450. Mitscher, Doskotch, and Beal.

**470 P 4****Pharmacology for Nurses**

A, Sp. 4 cl.

Prereq.: Chem. 102 or 122, and Physiol. 312.

Open only to students registered in School of Nursing.

A survey of the important drugs used in medicine and a consideration of their therapeutic applications. Wolf and Rahwan.

**475 P 5****Introduction to Disease**

Sp. 5 cl.

Prereq.: Anat. 200 and Physiol. 312.

A study of the nature and mechanisms of disease relative to the understanding of the action of drugs. Shaver and Visconti.

**503 P 5****Pharmaceutics III**

A. 3 cl., 1 3-hr. lab.

Prereq.: 402.

The application of physical chemical principles to pharmaceutics: solubility and mixed solvents, complexation, redox systems in pharmacy. Sokoloski, Frank, and Reuning.

**504 P 5****Pharmaceutics IV**

W. 3 cl., 1 3-hr. lab.

Prereq.: 503.

The application of physical chemical principles to pharmaceutics: heterogeneous systems, emulsions, suspensions, gels, and magmas. Frank, Sokoloski, and Reuning.

**505 P 5****Pharmaceutics V**

Sp. 3 cl., 1 3-hr. lab.

Prereq.: 504.

The formulation of compounded prescriptions and other dosage forms, with emphasis on drug availability, physiological requirements, incompatibility, prediction of stability and clinical effectiveness. Notari, Boxenbaum, Frank, Sokoloski, and Anderson.

**507 P 3****Manufacturing Pharmacy**

A. 1 cl., 2 3-hr. lab.

Prereq.: 402.

Formulation and mechanical fabrication of a wide variety of pharmaceutical dosage forms. Frank.

**508 P 3****Manufacturing Pharmacy**

W. 1 cl., 2 3-hr. lab.

Prereq.: 402.

A continuation of 507. Frank and Notari.

**509 P 3****Manufacturing Pharmacy**

Sp. 1 cl., 2 3-hr. lab.

Prereq.: 402.

A continuation of 507. Frank.



**511 P 2**

**History of Pharmacy I**

A. 2 cl.

Prereq.: 400.

A course designed to give the pharmacy student a deeper appreciation of the background of pharmacy and its development through the years. Buerki.

**512 P 2**

**History of Pharmacy II**

W. 2 cl.

Prereq.: 400.

A continuation of 511; emphasis on the development of the profession of pharmacy in Great Britain and the United States. Buerki.

**515 P 3**

**Hospital Pharmacy**

A, W, Sp. 1 cl., 2 3-hr. lab.

Prereq.: 402.

Repeatable to a maximum of 9 cr. hrs.

Introduction to and clinical experience in hospital pharmacy under the supervision of a registered pharmacist in University Hospital or Grant Hospital. Latiolas and Anderson.

**520 P 4**

**Pharmaceutical Marketing**

A. 3 75-min. cl.

Prereq.: Econ. 201.

A study of the pharmaceutical industry and the distribution of drug products and pharmaceutical services. Baldwin and Rucker.

**523 P 3**

**Pharmaceutical Record Keeping, Information Systems, and Control**

A. 3 cl.

Prereq.: Econ. 201.

Deals with the professional and business records used in pharmacy practice; emphasis on the understanding of principles through case studies. Baldwin and Rucker.

**524 P 4**

**Pharmacy Management**

W. 3 cl., 1 2-hr. lab.

Prereq.: 520, and 523 or Acc. 201.

A study of fundamental problems associated with planning, organizing, and controlling a community pharmacy emphasizing case problems to illustrate the practical application of management principles. Baldwin and Rucker.

**525 P 3**

**Pharmacy Management**

Sp. 2 cl., 1 2-hr. lab.

Prereq.: 524.

A continuation of 524. Baldwin and Rucker.

**553 P 3**

**Microscopical Pharmacognosy**

W, Sp. 3 2-hr. lab.

Prereq.: 451 or equiv.

A course embodying the principles of the microscope and the application of microchemical and specialized techniques in the detection, separation, and identification of drugs. Beal.

**577 P 3**

**Biological Products**

Sp. 3 cl.

Prereq.: Microbiol. 509.

U.S.P. standards and legal requirements governing manufacture, standardization, storage and distribution of toxins, antitoxins, serums, and vaccines. Beal and Mitscher.

**601 P 3**

**Cosmetology**

Sp. 1 cl., 2 2-hr. lab.

Prereq.: Senior standing or permission of instructor.

A study of the physical, chemical and physiological aspects of materials and products comprising the area of cosmetics with particular emphasis on allergenic properties and formulation. Frank and Sokoloski.

**606 P 5**

**Pharmaceutics VI**

A. 3 cl., 1 3-hr. lab.

Prereq.: 505.

A continuation of 505 with emphasis on the physical chemical properties of drugs and dosage forms and the nature and intensity of biological action. Notari, Malspeis, Boxenbaum, Sokoloski, and Anderson.

**609 P 3**

**The Pharmacy of Metabolic Agents**

Sp. 3 cl.

Prereq.: Senior standing.

A study of the pharmacy of medicinal products used in the treatment of deficiency diseases, malnutrition, and convalescence.

**610 P 3**

**Professional Practice I**

W. 3 2-hr. cl.

Prereq.: 606; concur. 679.

A clinical practice course designed to place the student in situations of the sort arising in professional community, hospital and nursing home practice. Salisbury, Anderson, Bonacci, and Sherrin.

**611 P 4**

**Professional Practice II**

Sp. 4 2-hr. cl.

Prereq.: 606 and 679.

A continuation of 610. Salisbury, Anderson, Bonacci, and Sherrin.

**613 P 3**

**New and Non-Official Drugs**

Sp. 3 cl.

Prereq.: Senior standing.

The pharmacy of the more commonly used new and non-official medicinals. Nelson.

**614 P 2****Professional Ethics**

Sp. 1 2-hr. cl.

Prereq.: 512 or permission of instructor.

The conceptual basis and content of pharmaceutical ethics; significance of codified ethics, interprofessionally considered; differences of view underlying ethical issues; methods of encouraging compliance. Buerki.

**615 P G 3****Sterile Products**

W. 2 cl., 1 3-hr. lab.

Prereq.: 504 or equiv.

Formulation, preparation, and testing of sterile products including injections, bulk solutions, and nasal and ophthalmic preparations. Latiolais.

**625 P 3****Pharmaceutical Jurisprudence**

Sp. 3 cl.

A study of the laws and regulations relating to the practice of pharmacy with emphasis on cases and court decisions illustrating the pharmacist's responsibilities. Salisbury.

**670 P G 6****Chemical Pharmacology I**

W. 5 cl., 1 3-hr. lab.

Prereq.: 433, 435, and 475.

An interdisciplinary approach to the fundamental chemical and pharmacological principles of drugs relative to their biochemistry, absorption, metabolic fate, pharmacodynamics and therapeutic applications. Feller, Gerald, Lewis, Miller, Patil, and Witiak.

**673 P G 6****Chemical Pharmacology II**

Sp. 5 cl., 1 3-hr. lab.

Prereq.: 670.

A continuation of 670. Feller, Gerald, Lapidus, and Wolf.

**676 P G 6****Chemical Pharmacology III**

A. 5 cl., 1 3-hr. lab.

Prereq.: 673.

A continuation of 673. Burkman, Feller, Lewis, Miller, Nelson, Rahwan, and Witiak.

**677 U P G 3****Toxicology**

W. 3 cl.

Prereq.: 676 or permission of instructor.

Fundamentals of modern and environmental toxicology with emphasis on preclinical and clinical testing of new drugs, principles of teratology, carcinogenicity and Mutagenicity, and drug interactions. Rahwan.

**679 P G 6****Chemical Pharmacology IV**

W. 5 cl., 1 3-hr. lab.

Prereq.: 676.

A continuation of 676. Burkman, Lewis, Miller, Mitscher, Nelson, and Witiak.

**680 P 3****Pharmacology of Newer Products**

Sp. 3 cl.

Concur.: 679.

Pharmacology of the more recent drugs and preparations and their therapeutic application. Nelson.

**681 P 3****Ocular Pharmacology**

Sp. 3 cl.

Prereq.: Optometry, 3rd yr. standing.

Open only to students registered in College of Optometry.

A survey of the general principles of drug action and the properties of drugs affecting ocular structure and function. Burkman.

**693 P 1-5****Individual Studies in the Pharmaceutical Sciences**

Su, A, W, Sp.

Prereq.: Junior standing, cumulative point-hour ratio of 2.5, and permission of instructor.

Repeatable to a maximum of 30 cr. hrs.

Laboratory and library work designed to give the qualified student an opportunity to complete an original investigation or pursue an interest in a special problem.

**694 P 1-5****Group Studies in Pharmacy**

Su, A, W, Sp. 1-5 cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 30 cr. hrs.

Group studies of selected topics in various fields of pharmacy.

**695 P 2****Seminar**

A, W, Sp. 2 cl.

Prereq.: Senior standing or permission of instructor.

Repeatable to a maximum of 6 cr. hrs.

Problems arising out of professional relations of the pharmacist with the physician, medical interns, nurses, laboratory technicians, and the laity.

**700 P G 5****Radioisotope Tracer Techniques and Radiopharmaceuticals**

A. 3 cl., 2 3-hr. lab.

Prereq.: Permission of instructor.

A survey of the properties of radioisotopes and radiation; radioisotope tracer methods and applications to pharmaceutical sciences; the preparation, standardization, and handling of radiopharmaceuticals. Malspeis and Feller.

**705 P G 3****Individualization of Drug Dosage**

W, Sp. 3 cl.

Prereq.: 606, and 676 or permission of instructor.

Repeatable to a maximum of 6 cr. hrs.

A problem-oriented course designed to provide experience in recognition and solving of patient cases where drug dosage regimen must be modified to optimize therapy. Reuning and Visconti.

**710 P G 3**

**Biopharmaceutics**

W. 3 cl.

Prereq.: Senior standing or permission of instructor. Interrelationships of absorption, distribution, metabolism, storage, and excretion of drugs with the physical-chemical and biological properties of body tissues, drugs and drug dosage forms. Reuning, Boxenbaum, and Notari.

**715 P G 3**

**Hospital Pharmacy and the Hospital Organization**

A. 3 cl.

Prereq.: Senior standing, 515 or equiv., and permission of instructor.

Hospital organization and the relationship of the departmental components to the pharmacy. Latiolais and Visconti.

**717 P G 5**

**Drug Therapy in Clinical Practice**

A, W, Sp. 1 cl., 12 lab. hrs.

Prereq.: 676 or permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

A clinical program involving didactic, seminar, and clinical instruction in patient drug therapy using facilities of University, Children's, Grant, and Riverside Hospitals. Visconti, Burkman, Miller, and Staff.

**737 P G 5**

**Advanced Pharmaceutical Analysis**

Sp. 3 cl., 2 3-hr. lab.

Prereq.: 436 or permission of instructor.

The use of specialized instruments in the assay and control methods of drugs and drug preparations. Olson.

**754 P G 3**

**Microscopical Pharmacognosy**

Sp. 1 cl., 2 2-hr. lab.

Prereq.: 553 or equiv.

Pharmaceutical applications of specialized microscopic instruments. Beal.

**789 P G 5**

**Isolation Techniques in Research**

W. 3 cl., 2 3-hr. lab.

Prereq.: Chem. 242 and 246 or equiv. or permission of instructor.

A study and application of selected isolation techniques for the purification of natural products or other organic mixtures. Doskotch.

**805 G 3**

**Technology**

W. 1 cl., 2 3-hr. lab.

Prereq.: 606 or equiv.

Principles and practice in processing pharmaceutical dosage forms by the use of machines; emphasis is on fundamentals of unit processes in pharmaceutical manufacture.

**806 G 2-3**

**Advanced Technology**

Sp. 6-9 hrs. lab.

Prereq.: 606 or equiv.

Repeatable to a maximum of 9 cr. hrs.

A laboratory course designed to permit study of a variety of problems in pharmaceutical production, with the ultimate aim of pilot plant scale production.

**809 G 3**

**Product Development**

Su. 1 cl., 2 3-hr. lab.

Prereq.: 606 or equiv.

Study of problems involved in formulation of suitable dosage forms and the relationship of physical, chemical, therapeutic, and organoleptic properties of medicaments to principles of formulation.

**811 G 3**

**Advanced Pharmacy**

W. 3 cl.

Prereq.: Chem. 521 or 533, and permission of instructor.

A study of the application of physical chemical principles to the design and development of fluid pharmaceutical dosage forms. Sokoloski, Malspeis, Notari, Reuning, Frank, and Boxenbaum.

**812 G 3**

**Advanced Pharmacy**

Sp. 3 cl.

Prereq.: Chem. 521 or 533, and permission of instructor.

A study of the methods used to predict, determine, and improve the stability characteristics of medicinal agents in dosage form. Notari, Frank, Malspeis, Reuning, and Sokoloski.

**816 G 3**

**Principles of Hospital Pharmacy**

W. 3 cl.

Prereq.: 715.

Administrative and professional principles and concepts of, and trends affecting, hospital pharmacy. Latiolais and Visconti.

**817 G 3**

**Principles of Hospital Pharmacy**

Sp. 3 cl.

Prereq.: 816.

A continuation of 816. Latiolais and Visconti.

**820 G 3**

**Social Aspects of Drug Use**

W. 3 cl.

Prereq.: Permission of instructor.

A study of the social aspects of drug use with emphasis on reviewing pertinent research and developing new research approaches to existing problems. Baldwin and Rucker.

**825 G 3**

**Advanced Pharmaceutical Marketing**

W. 3 cl.

Prereq.: 520, and Bus. Admin. 650 or equiv.

Theoretical aspects of drug marketing with emphasis on policies and practices of the pharmaceutical manufacturer. Baldwin and Rucker.

**826 G 3****Advanced Pharmacy Administration**

Su, A. 3 cl.

Prereq.: 825 and Bus. Admin. 500 or equiv.

Repeatable to a maximum of 6 cr. hrs.

Investigation and analysis of selected areas of pharmacy administration for group discussion and written report; case problems, review of current literature, and research. Baldwin and Rucker.

**835 G 3****Advanced Medicinal Chemistry**

W. 3 cl.

Prereq.: 679 or equiv., and Chem. 833, or permission of instructor.

Chemistry of autonomic receptor sites; recent literature references on the biological, chemical, and stereochemical requirements for adrenergic and cholinergic stimulation and blockade. Lewis, Miller, and Witiak.

**836 G 3****Advanced Medicinal Chemistry**

Sp. 3 cl.

Prereq.: 679 or equiv., and Chem. 833, or permission of instructor.

Selected topics in medicinal chemistry, the subject matter being drawn from the current literature. Lewis, Miller, and Witiak.

**845 G 3****Advanced Medicinal Chemistry**

W. 3 cl.

Prereq.: 679 or equiv., and Chem. 833, or permission of instructor.

Concepts of conformational analysis; recent selected literature references on the subject; the application of this science to the design and synthesis of biologically active molecules. LaPidus, Lewis, Miller, and Witiak.

**846 G 3****Advanced Medicinal Chemistry**

A. 3 cl.

Prereq.: Chem. 833.

Repeatable to a maximum of 6 cr. hrs.

Synthesis of selected natural products; course content to change every two years; topic examples: steroids, alkaloids, heterocyclic compounds, tropolones and aromatic systems, vitamins, etc. Lewis, Miller, and Witiak.

**850 G 1****Seminar**

A, W, Sp. 1 cl.

Repeatable to a maximum of 30 cr. hrs.

Round-table discussion, oral and written reports dealing with recent advances in the pharmaceutical sciences.

**851 G 3****Advanced Pharmacognosy**

Sp. 3 cl.

Prereq.: Biochem. 707 or Bot. 631 or permission of instructor.

A study of research involving biosynthesis of plant constituents of pharmaceutical interest. Doskotch, Mitscher, and Beal.

**852 G 3****Medicinal Plant Propagation and Cultivation**

Su. 3 cl.

Prereq.: Bot. 631 or permission of instructor.

A study of the methods employed and problems involved in the propagation, cultivation, harvesting, and evaluation of medicinal plants. Beal.

**Drug Metabolism**

(See Pharmacol. 852.)

[Offered in cooperation with Dept. of Pharmacol.]

(Discussions of mechanisms of biotransformation of drugs by enzymes, pharmacologic characteristics of these systems, and techniques for the study of drug metabolism.)

**855 G 3****Plant Drug Constituents**

W. 2 cl., 1 3-hr. lab.

Prereq.: Permission of instructor.

A study of the more important classes of constituents obtained from plants, including methods of isolation, purification, and identification. Mitscher, Doskotch, and Beal.

**870 G 3****Theories in Pharmacology**

A. 3 cl.

Prereq.: 679 or equiv.

Orientation to graduate pharmacology; an introduction into theories of pharmacology and the research approach in pharmacology. Burkman.

**871 G 3****Screening Methods in Pharmacology**

W. 1 cl., 2 3-hr. lab.

Prereq.: 870 or equiv., Genetics 650 or equiv., and permission of instructor.

Qualitative pharmacology covering the standard laboratory procedures and methods used in routine screening and laboratory evaluation of new drugs. Wolf.

**872 G 3****Advanced Methods in Pharmacology**

Sp. 1 cl., 2 3-hr. lab.

Prereq.: 871 and permission of instructor.

Theory and techniques involving spinal cat, tissue denervation, perfused heart aortic strips, calculation of  $pA_2$  and  $pD_2$ , receptor protection experiments; biogenic amine fluorescence microscopy, etc. Patil.**880 G 3****Biological Standardization**

Su. 1 cl., 2 3-hr. lab.

Prereq.: 871 and permission of instructor.

Quantitative pharmacology covering principles of bioassay design and interpretation; laboratory consists of the performance of standard bioassays.

**881 G 3****Advanced Topics in Pharmacology**

Su, A, W, Sp. 3 cl.

Prereq.: 871 and permission of instructor.

Repeatable to a maximum of 9 cr. hrs.

A study of current advanced theories of pharmacodynamics.

993 G 1-5

**Individual Studies  
in the Pharmaceutical Sciences**

Su, A, W, Sp.

Repeatable to a maximum of 30 cr. hrs.

Individual investigation of problems in one of the areas below:

- a. Administrative and Social Sciences in Pharmacy.
- b. Clinical Pharmacy and Professional Practice.
- c. Medicinal Chemistry.
- d. Pharmaceutics and Pharmaceutical Chemistry.
- e. Pharmacognosy and Natural Products Chemistry.
- f. Pharmacology.

994 G 1-5

**Group Studies in the Pharmaceutical Sciences**

Su, A, W, Sp. 1-5 cl., opt. lab.

Prereq.: Permission of instructor.

Repeatable to a maximum of 30 cr. hrs.

Group studies of selected topics in various fields of the pharmaceutical sciences.

999 G Arr.

**Research in the Pharmaceutical Sciences**

Su, A, W, Sp.

Research for thesis or dissertation purposes only.

## Philosophy

Office: 200 Lord Hall, 124 West 17th Avenue

**Professors** Turnbull (Chairman), Boh, Evans (Emeritus), Fox, Hinshaw, Oldenquist, Nelson (Emeritus), and Scanlan; **Associate Professors** Anderson, Brown, Garner, Hausman, Kielkopf, Reither (Emeritus), Rosen, and Swain (Visiting); **Assistant Professors** Farrell, Laymon, Lycan, Machamer, Pappas, Robison, and Schumm; **Instructor** Boer.

101 U 5

**Introduction to Philosophy**

Su, A, W, Sp.

H101 (Honors) may be available to students enrolled in a college Honors Program or by permission of dept.

Not open to students with credit for 100.

Examination of major problems, such as the nature of reality, knowledge, truth, morality, and of the relation of philosophy to science and religion.

130 U 5

**Introduction to Ethics**

Su, A, W, Sp.

H130 (Honors) may be available to students enrolled in a college Honors Program or by permission of dept.

The nature of right and wrong, good and evil; the grounds of moral choice and decision; the resolution of moral conflicts.

150 U 5

**Introduction to Logic**

Su, A, W, Sp.

H150 (Honors) may be available to students enrolled in a College Honors Program or by permission of dept.

Deduction and induction; principles of clear statement and valid reasoning; fallacies; and the methods by which theories and laws are established.

210 U 5

**Philosophical Bases of Western Culture**

A, W.

Prereq.: Sophomore standing.

Major themes in philosophy in the context of the development of western culture.

230 U 5

**Political and Social Philosophy**

A, W, Sp.

Philosophical bases of social and political institutions and practices; analysis of such fundamental conceptions as rights, justice, equality, political obligation, and civil disobedience.

240 U 5

**Esthetics**

A, W, Sp.

Principal systems of esthetics; interpretation of the creative activity of the artist, the work of art, and the contemplation and criticism of art objects.

250 U 5

**Symbolic Logic**

A, W, Sp.

A formal presentation of the elements of modern and classical deductive logic; decision and proof procedures in sentential logic, functional logic, and Aristotelian logic.

270 U 3

**Introduction to Philosophy of Religion**

Su.

Not open to students with credit for 170.

A philosophical analysis of the nature of religion and the foundations of religious belief.

511 U G 5

**History of Ancient and Hellenistic Philosophy**

A.

512 U G 5

**History of Philosophy from Bacon to Hume**

W.

513 U G 5

**History of Philosophy from Kant  
Through the 19th Century**

Sp.

520† U G 3

**American Philosophy**

Sp.

Not open to students with credit for 613.

The development of American philosophy; puritanism, deism, transcendentalism, and pragmatism.

**525 U G 3****Russian Philosophy**

A.

Prereq.: One course in the history of philos., permission of instructor.

Selected topics in the history of Russian philosophy: Western influences; slavophilism and Russian religious thought; philosophy of Dostoyevsky and Tolstoy; Russian emigre philosophy.

**560 U G 5****History of Jewish Philosophy I**

A.

History of Jewish thought in antiquity and the Middle Ages; emphasis on Philo, Saadia, Judah Halevi in the context of their Greek and Arabic backgrounds.

**561 U G 5****History of Jewish Philosophy II**

W.

Jewish thought from the 12th through the 19th century; Maimonides and his successors, Gersonides, Crescas, Albo; Moses Mendelssohn and the development of modern Jewish thought.

**H570 U G 3-5****Junior-Senior Proseminar**

W.

Prereq.: 11 hrs. of philos., and either 3.25 or better cumulative point-hour ratio with 3.5 or better in philos., or permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

Topics vary; emphasis on recent philosophical writing in some specific area or on some specific problem.

**GENERAL PREREQUISITES FOR COURSES  
NUMBERED 600 and 700**

Not open to freshmen or sophomores. Unless otherwise indicated the prerequisites for 600 and 700-level courses are 10 hours in philosophy.

**611† U G 5****Contemporary Philosophy**

W.

Examination of the doctrines of such philosophers as Bergson, Santayana, Whitehead, Russell, and Dewey.

**614 U G 5****Medieval Philosophy**

Sp.

Prereq.: 10 cr. hrs. of philos. including 511, or 712 and 713.

Not open to students with credit for 714.

An examination of the main trends in the thought of the Middle Ages, based on a study of characteristic works of some of the most important medieval philosophers.

**615\* U G 5****Pragmatism**

A.

An examination of the main themes of pragmatism: pragmatic theories of truth, reality, nature of physical objects, knowledge of reality, and normative matters.

**617 U G 5****Existentialism**

W.

Introduction to the major doctrines of existentialism through writings of representative existentialists, such as Kierkegaard, Sartre, Jaspers, and Heidegger.

**620\* U G 3****Philosophy of Maimonides**

Sp.

An intensive study of the structure and argument of Maimonides' *Guide of the Perplexed*; relevant materials from his other writings will also be examined.

**625† U G 3****Marxist Philosophy**

Sp.

Prereq.: one course in the history of philos. or permission of instructor.

Classical (traditional) Marxism; dialectical materialism as elaborated in the USSR; recent development in humanistic Marxism deriving from Marx's early philosophical writings.

**630 U G 5****Advanced Political and Social Philosophy**

Sp.

Prereq.: 230 or permission of instructor.

An intensive examination of issues in political and social philosophy, including democracy, civil disobedience, anarchism, totalitarianism, nature of the state, etc.

**631 U G 5****Advanced Ethical Theory**

A.

Prereq.: 130.

An intensive examination of representative ethical systems such as egoism, hedonism, intuitionism, and utilitarianism.

**641 U G 5****Advanced Esthetic Theory**

W.

Selected issues in philosophy of art, e.g., truth in art, the function of criticism; concentrated study of problems dealing with a particular genre.

**650 U G 5****Advanced Symbolic Logic**

W.

Prereq.: 250.

Advanced techniques in functional logic and proof procedures; the axiomatization of sentential logic and the lower functional calculus; introduction to the higher functional calculus.

**652 U G 5****Nonclassical Logic**

W.

Prereq.: 650.

Repeatable to a maximum of 10 cr. hrs.

Philosophical study of selected systems of nonclassical logic, such as entailment systems, modal, many valued, epistemic, deontic, imperative erotetic, tense, and free logics.

653\*

U G 5

**Inductive Logic and Probability**

A.

Prereq.: 150 or permission of instructor.

Analysis of types of empirical inference; natural law and confirmation theory; calculus and nature of probability; philosophic presuppositions of inductive inference.

660

U G 5

**Theory of Knowledge I**

A.

Prereq.: 250 or permission of instructor.

A survey of major epistemological problems: the possibility, origin, foundation, structure, methods, limits, types, and validity of knowledge.

663

U G 5

**Metaphysics I**

Sp.

Prereq.: 250 or permission of instructor.

A survey of major metaphysical problems: categories, universals, substance and process, causality and law, space and time, metaphysical presuppositions of knowledge.

668

U G 5

**Philosophy of Law**

A. 3 cl.

An examination of the nature and function of law and of such problems as the relation of law to morality and the justification of punishment.

671\*

U G 3

**Philosophy of History**

Sp.

An essay of representative speculative theories of history; analysis of critical problems arising in the pursuit of historical knowledge.

672

U G 5

**Philosophy in Literature**

A.

Philosophical problems as reflected in classics of literature, such as the Greek dramatists, Shakespeare, Voltaire, T. S. Eliot, Proust, and Tolstoy.

673

U G 5

**Philosophy of Language**

Sp.

Prereq.: 150, or permission of instructor.

Semantics and language analysis; functions of language; modes of meaning, relation of linguistic structure to metaphysics.

674

U G 5

**Philosophy of Logic and Mathematics**

W.

Prereq.: 651.

Analysis of basic concepts used in logic and in philosophical claims about logic and mathematics, such as: proposition, logical truth, mathematics objects, and necessity.

675

U G 5

**Philosophy of Religion**

W.

A study of religious concepts and problems; the idea and nature of God, of man, their relation to the world and human destiny.

676

U G 3

**Philosophy of Science**

A.

A study of the nature and structure of scientific concepts, laws, and theories; appraisal of methodologies, presuppositions, and frames of reference in science.

677

U G 3

**Conceptions and Methods of the Social Sciences**

W.

Philosophic assumptions of social science: nature of explanation (methodological individualism, holism, functionalism); methods in natural and behavioral science; fact and value in social inquiry.

693

U G 2-10

**Individual Studies**

Su, A, W, Sp.

Prereq.: Permission of department chairman.

Students ordinarily earn from 2 to 5 cr. hrs., but Honors students may earn up to 10 cr. hrs.

694

U G 2-15

**Group Studies**

A, W, Sp.

Prereq.: Permission of chairman.

Repeatable to a maximum of 30 cr. hrs.

712†\*

U G 5

**Philosophy of Plato**

A.

Prereq.: 10 cr. hrs. of philos. including 511.

713\*

U G 5

**Philosophy of Aristotle**

W.

Prereq.: 10 cr. hrs. of philos. including 511.

715

U G 5

**Selected Topics in Medieval Philosophy**

Sp.

Prereq.: 10 cr. hrs. of philos. including 511.

Not open to students with credit for 714.

Repeatable to a maximum of 21 cr. hrs.

716

U G 5

**Philosophy of Berkeley**

A.

Prereq.: 10 cr. hrs. of philos. including 512.

717\*

U G 5

**Philosophy of Descartes**

Sp.

Prereq.: 10 cr. hrs. of philos. including 512.

**718\* U G 5**

**Philosophy of Locke**

A.

Prereq.: 10 cr. hrs. of philos. including 512.

**719† U G 5**

**Philosophy of Spinoza**

W.

Prereq.: 10 cr. hrs. of philos. including 512.

**720 U G 5**

**Philosophy of Leibniz**

W.

Prereq.: 10 cr. hrs. of philos. including 512.

**721 U G 5**

**Philosophy of Hume**

Sp.

Prereq.: 10 cr. hrs. of philos. including 512.

**722\* U G 5**

**Kant: Critique of Pure Reason**

W.

Prereq.: 10 cr. hrs. of philos. including 513.

**723\* U G 5**

**Kant: Critique of Practical Reason and Critique of Judgment**

Sp.

Prereq.: 722.

**724\* U G 5**

**Philosophy of Hegel**

Sp.

Prereq.: 10 cr. hrs. of philos. including 513.

**728† U G 5**

**History of Logic**

Sp.

Prereq.: 651 or permission of instructor.

A history of logic from ancient Greek times to the present.

**750 U G 5**

**Advanced Logical Theory**

Sp. 3 cl.

Prereq.: 250 and 650.

Repeatable to a maximum of 15 cr. hrs.

Topics include Godel's incompleteness and completeness proofs, Church's theorem, Russell's theories of description, relations, classes arithmetic, logical truth, logical paradoxes; topics vary yearly.

**761 U G 5**

**Theory of Knowledge II**

Sp.

Prereq.: 660 or permission of instructor.

An intensive study of a systematic epistemological treatise, such as Blanshard's *Nature of Thought*, Lewis' *Mind and the World Order*, or Lovejoy's *Revolt Against Dualism*.

**764† U G 5**

**Metaphysics II**

W.

Prereq.: 663 or permission of instructor.

An intensive study of a systematic metaphysical treatise.

**767 U G 5**

**Philosophy of Mind**

A.

Classical and contemporary approaches to the nature of mind, mind-body, other minds, intentionality, and other problems.

**770 U G 3-5**

**Advanced Studies in Philosophy**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 21 cr. hrs.

**771 U G 5**

**Selected Topics in Analytic Philosophy**

A, W, Sp.

Prereq.: 150 and 611.

Repeatable to a maximum of 21 cr. hrs.

**776\* U G 5**

**Problems in Philosophy of Science**

Sp.

Prereq.: 250 or permission of instructor.

Detailed and critical examination of significant contributions to the traditional and contemporary philosophical literature on the philosophy of science.

**H783 U 3-5**

**Honors Course**

Su, A, W, Sp.

Prereq.: 4th yr. standing with a grade of A in at least half of the Philos. courses taken with an average of B in the remainder; permission of instructor under whose supervision the work is to be completed and the Arts and Sciences Honors Committee. At least 2 quarters are required of candidates for the B.A. with distinction in Philos. Failure to receive a mark of S in this course is a disqualification for special honors.

Repeatable to a maximum of 15 cr. hrs.

A program of reading arranged for each student, with individual conferences, reports and papers.

**GENERAL PREREQUISITES FOR COURSES  
NUMBERED 800 AND 900**

Unless otherwise indicated the prerequisites for 800 and 900-level courses are acceptable foundation courses either in general philosophy, logic and ethics, or history of philosophy, and in some cases in all these subjects.

**800† G 1**

**Current Philosophical Literature**

A, W, Sp.

Repeatable to a maximum of 6 cr. hrs.

Current philosophical journal articles will be read and discussed.

**811 G 5**

**Seminar in the History of Philosophy**

A.

Repeatable to a maximum of 15 cr. hrs.



**830\***                    **G 5**  
**Seminar in Political and Social Philosophy**  
 Sp.  
 Repeatable to a maximum of 15 cr. hrs.

**831**                    **G 5**  
**Seminar in Ethics**  
 W.  
 Repeatable to a maximum of 15 cr. hrs.

**841†**                    **G 5**  
**Seminar in Esthetics**  
 Sp.  
 Repeatable to a maximum of 15 cr. hrs.

**850\***                    **G 5**  
**Seminar in Logic**  
 Sp.  
 Repeatable to a maximum of 15 cr. hrs.

**853†**                    **G 5**  
**Seminar in Induction and Probability Theory**  
 Sp.  
 Repeatable to a maximum of 15 cr. hrs.

**861**                    **G 5**  
**Seminar in Theory of Knowledge**  
 Su.  
 Repeatable to a maximum of 15 cr. hrs.

**864†**                    **G 5**  
**Seminar in Metaphysics**  
 A.  
 Repeatable to a maximum of 15 cr. hrs.

**870†**                    **G 5**  
**Seminar in Philosophy of Mathematics**  
 Sp.  
 Repeatable to a maximum of 15 cr. hrs.

**871†**                    **G 5**  
**Seminar in Philosophy of Logic**  
 A.  
 Prereq.: 651 or permission of instructor.  
 Repeatable to a maximum of 15 cr. hrs.  
 Differing views on the nature of logical inference and logical truth.

**873†**                    **G 5**  
**Seminar in Philosophy of Language**  
 W.  
 Repeatable to a maximum of 15 cr. hrs.

**875†**                    **G 5**  
**Seminar in the Philosophy of Religion**  
 W.  
 Repeatable to a maximum of 15 cr. hrs.

**877†**                    **G 5**  
**Seminar in Philosophy of Science**  
 Sp.  
 Repeatable to a maximum of 15 cr. hrs.

**885†**                    **G 5**  
**Seminar in Philosophical Analysis**  
 W.  
 Repeatable to a maximum of 15 cr. hrs.

**Medieval and Renaissance Culture**  
 (See Medieval and Renaissance Studies 888.)

**993**                    **G 2-15**  
**Individual Studies**  
 Su, A, W, Sp.  
 Prereq.: An M.A. degree or at least 50 cr. hrs. of graduate study, and permission of department chairman.  
 Doctoral students may register for individual study in areas not normally covered by courses.

**999**                    **G Arr.**  
**Research in Philosophy**  
 Su, A, W, Sp.  
 Research for thesis or dissertation purposes only.

## Photography and Cinema

Office: 204 Haskett Hall, 156 West 19th Avenue.

**Professors** Wagner (Chairman), Clarke, and Davis (Emeritus); **Associate Professors** Binau, Craig, Drvota, Elgabri, and Longshore; **Adjunct Associate Professor** Tressel; **Assistant Professors** Ball, Dilley, Piatt, Schuth, and Vibberts; **Instructors**.

**201**                    **U 3**  
**Photography**  
 Su, A, W, Sp. 2 cl., 2 2-hr. lab.  
 Prereq.: 2nd year standing.  
 Fundamentals of photography, including cameras, emulsion characteristics, processing, filters, chemistry, and optics. Binau, Craig, Dilley, and Vibberts.

**203**                    **U 3**  
**Photography and Design**  
 Sp. 2 cl., 2 2-hr. lab.  
 Prereq.: 10 hrs. of design courses or permission of instructor.  
 Not open to students with credit for 201 or 594.  
 The fundamentals of photography with emphasis on camera technique, processing and printing as utilized in graphics and design. Binau and Vibberts.

**502**                    **U G 3**  
**The History of Photography**  
 Su, A, Sp. 3 1-hr. cl. and lab.  
 Prereq.: Grad. or 4th yr. standing.  
 Study of the history of photography and its contribution to the arts and sciences; the critical and aesthetic considerations of the photographic image. Craig.

**503 U G 3****The History of Cinema**

Su, W. 2 2-hr. cl. and lab.

Prereq.: Grad. or 4th yr. standing.

History of the motion picture and critique at the contextual, artistic, technical, and information levels; evaluative study of selective films. Schuth.

**504 U G 3****Photography: The Early Years**

W. 3 1-hr. cl.

A study of the discovery of photography and its early history, with its contribution to the arts, sciences, and society in the 19th century. Craig.

**505 U G 3****Film Theory and Criticism**

A, Sp. 2 2-hr. cl.

Prereq.: Grad. or 4th yr. standing and permission of instructor.

Study of the development of the film theory and its relation to the other arts; aesthetic of the medium and the modes of film communication as created, viewed, and analyzed. Schuth.

**506 U G 3****Photographic Communications**

A, W, Sp. 2 2-hr. cl.

Prereq.: Grad. or 4th yr. standing and permission of instructor.

Study of the photographic image in relation to communication theory; development of photographic and motion picture systems in educational and information programs. Silverman and Wagner.

**509 U G 3****The Photographic Process**

W. 3 cl.

Prereq.: 201 or 551.

The principles and theories in the photographic process, including optics, chemistry, sensitometry, and nonconventional processes. Craig.

**510 U G 3****The Silent Cinema**

W. 2 2-hr. cl.

Repeatable to a maximum of 3 cr. hrs.

An intensive study of the silent film, its growth and development of film as an international medium. Drvota.

**521 U G 5****Advanced Photography I**

Su, A, W, Sp. 2 cl., 2 2-hr. lab.

Prereq.: 201 or 594, and permission of instructor.

Not open to students with credit for 501.

Advanced techniques related to specific topics with emphasis on creative photography. Binau, Craig, Dilley, and Vibberts.

**522 U G 5****Advanced Photography II**

Su, A, Sp. 2 cl., 2 2-hr. lab.

Prereq.: 501 or 521, and permission of instructor.

Continuation of 501 or 521; emphasis on photographic theory. Dilley and Vibberts.

**531 U G 5****Color Photography I**

A, Sp. 2 cl., 2 2-hr. lab.

Prereq.: 521 or 552, and permission of instructor.

Principles of color photography including color theory, lighting, and recent color processes. Craig and Vibberts.

**532 U G 5****Color Photography II**

W. 2 cl., 2 2-hr. lab.

Prereq.: 531 and permission of instructor.

Continuation of 531 with emphasis on color printing; consideration of the relationship of color theory and problems to motion pictures, television, and other creative and technical media. Craig and Vibberts.

**551 U G 3****Motion Picture Production I**

Su, A, W, Sp. 2 2-hr. cl. and lab.

Prereq.: Permission of instructor.

Not open to students with credit for 507 or 508.

Principles and procedures in motion picture production including camera, metering, laboratory, editing, and projection systems; emphasis on the silent film as a form of visual expression. Elgabri, Schuth, and Staff.

**552 U G 5****Motion Picture Production II**

A, W, Sp. 2 2-hr. cl. and lab.

Prereq.: 551 and permission of instructor.

Not open to students with credit for 507.

Intermediate motion picture production with emphasis on scripting, camera, and sound; examination of editorial process, relationships between film and television, and animation. Elgabri, Schuth, and Staff.

**553 U G 5****Motion Picture Production III**

A, Sp. 2 2-hr. cl. and lab.

Prereq.: 552 and permission of instructor.

Not open to students with credit for 508.

Advanced motion picture production; emphasis on production planning and management, screen directing, color, widescreen, multiple-screen, and other contemporary forms. Elgabri, Schuth, and Staff.

**558 U G 3****Advanced Cinematography**

W. 2 2-hr. cl.

Prereq.: 551.

The study of the principles of motion picture lighting and the analysis of the psychological and aesthetic impact of lighting designs and camera work on audiences. Elgabri and Sims.

**574 U G 5****Photography for Science Students**

Su, W. 3 cl., 2 2-hr. lab.

Prereq.: Science major with 3rd yr. standing.

Not open to students with credit for 521.

For students in physical and biological science who need a knowledge of photography as an aid to their scientific work; application of photography to science. Binau.

**575 U G 3****Photography for Architecture Students**

A. 2 cl., 2 2-hr. lab.

Prereq.: 15 hrs. of Arch. courses or permission of instructor.

Not open to students having credit for 201, 203, or 594.

The fundamentals of photography for students majoring in architecture. Camera techniques, darkroom techniques, perspective control, three-dimensional photography. Vibberts.

**594† U G 5****Scientific Photography**

Su, W. 3 cl., 2 2-hr. lab.

Prereq.: Science major, or 201 and 521.

Not repeatable.

For students in physical and biological science who need a knowledge of photography as an aid to their scientific work; application of photography to science. Binau and Craig.

**608 U G 5****The Reality Image I**

A. 5 cl.

Prereq.: 502, 503, 504, or 506.

The photograph and motion picture as images of reality, form; styles; social functions; evidential, critical, creative, and humanistic issues involved in developing documentary imagery. Wagner and Staff.

**609 U G 5****The Reality Image II**

W. 5 cl.

Prereq.: 608.

The photograph and motion picture as images of reality; a continuation of Photography and Cinema 608. Wagner and Staff.

**666 U G 5****Advanced Motion Picture Direction**

W. Approx. 6 arr. hrs. per wk.

Prereq.: 553 and permission of instructor.

A study of theoretical and documentary film direction with emphasis on the director's role in relation to performance and camera direction. Elgabri.

**693 U G 3-5****Individual Studies in Photography**

Su, A, W, Sp. 4-8 lab. hrs.

Prereq.: 9 cr. hrs. in photog. and cinma. and permission of instructor.

Repeatable to a maximum of 18 cr. hrs.

Use of departmental facilities for adding to the student's knowledge of a specially selected photographic problem pertaining to his major field.

**694 U G 3-5****Group Studies in Photography and Cinema**

Su, A, W, Sp. 2 2-hr. cl.

Prereq.: Written permission of instructor.

Repeatable to a maximum of 18 cr. hrs.

- Script writing for film.
- Film animation.
- Elements of sound.
- The editorial process.
- Design and production of educational films.
- Contemporary photography.

**794 U G 3-5****Group Studies in Photography**

A, W, Sp.

Prereq.: 15 cr. hrs. in photog. and cinma.

Repeatable to a maximum of 18 cr. hrs.

Specialized problems, processes, and theories designed for students concentrating on the advanced study of photography and cinema at the M.A. and Ph.D. levels.

- Screen Directing.
- The Photographic Image and Society.
- Contemporary Cinema.
- Motion Picture Production Management.

## Physical Education

**Lewis A. Hess, Director of School**

Office: 216 Pomerene Hall, 1760 Neil Avenue

**Naomi Allenbaugh, Assistant Director of School**

Office: 201 Pomerene Hall, 1760 Neil Avenue

**Professors** Mand (Chairman), Allenbaugh, Bartels, Bennett, Hayes, Hess, Kleinmen, Mathews, Mordy, Rupert, and Yost; **Associate Professors** Bailey, Coates, Ersing, Fox, Harper, Hendrix, Hewlett, Karow, Montonaro, Morris, Nelson, Schroeder, Siedentop, Stevens, Sweeney, and Wheeler; **Assistant Professors** Beekman, Breiner, Fredericks, Gilliom, House, Hull, C. O'Brien, Oyster, Sarkkinen, Simonian, and Taylor; **Instructors** Althoff, Bruce, Burkholder, Campbell, Daly, Grinre, Hinton, Myers, R. O'Brien, Patterson, Raysa, Ruggieri, Servedio, Wardwell, and Zubovich.

**101 U 1****Physical Education (Men)**

Su, A, W, Sp. 2 cl.

Required of all freshman men; not open to Phys. Ed. majors and minors.

Instructions in the techniques of play, rules, strategies, and the social behavior involved in sports and dance activities.

**102 U 1****Physical Education (Men)**

Su, A, W, Sp. 2 cl.

Required of all freshman men; not open to phys. ed. majors and minors.

Continuation of 101.

**103 U 1****Physical Education (Men)**

Su, A, W, Sp. 2 cl.

Required of all freshman men; not open to phys. ed. majors and minors.

Continuation of 102.

**104 U 1****Physical Education (Women)**

Su, A, W, Sp. 2 cl.

Required of all freshman women; not open to phys. ed. majors and minors.

Instructions in the techniques, rules, strategy, and social behaviors of a sport or dance activity selected by the student from a wide range of offerings.

**105 U 1****Physical Education (Women)**

Su, A, W, Sp. 2 cl.

Required of all freshman women; not open to phys. ed. majors and minors.

Continuation of 104.

**106 U 1****Physical Education (Women)**

Su, A, W, Sp. 2 cl.

Required of all freshman women; not open to phys. ed. majors and minors.

Continuation of 105.

**107 U 1****Physical Education**

Su, A, W, Sp. 2 lab. hrs.

Not open to phys. ed. majors.

Cannot be repeated for credit.

- a. Men.  
A continuation of 103.
- b. Women.  
A continuation of 106.

**108 U 1****Physical Education**

Su, A, W, Sp. 2 lab. hrs.

Continuation of 107.

- a. Men.
- b. Women.

**109 U 1****Physical Education**

Su, A, W, Sp. 2 lab. hrs.

Continuation of 108.

- a. Men.
- b. Women.

**111 U 1****Physical Education (Men)**

A. 3 lab. hrs.

Open only to men Phys. Ed. majors or minors.

Instructions in the techniques of skills, rules strategies, and the social behavior involved in sports and dance activities.

**112 U 1****Physical Education (Men)**

W. 3 lab. hrs.

Open only to men Phys. Ed. majors and minors.

Continuation of 111.

**113 U 1****Physical Education (Men)**

Sp. 3 lab. hrs.

Open only to men Phys. Ed. majors and minors.

Continuation of 112.

**114 U 1****Physical Education (Women)**

A. 3 lab. hrs.

Open only to women Phys. Ed. majors and minors.

Instructions in the techniques, rules, strategy, and social behaviors of a sport or dance activity selected by the student from a wide range of offerings.

**115 U 1****Physical Education (Women)**

W. 3 lab. hrs.

Open only to women Phys. Ed. majors and minors.

Continuation of 114.

**116 U 1****Physical Education (Women)**

Sp. 3 lab. hrs.

Open only to women Phys. Ed. majors and minors.

Continuation of 115.

**131 U 2****Physical Education Activities**

A. 5 2-hr. labs.

Prereq.: Permission of chairman.

Required of phys. ed. majors.

These courses aim to develop knowledge, understandings, and skills in the basic activities appropriate to the teacher of physical education.

- a. Men.
- b. Women.

**132 U 2****Physical Education Activities**

W. 5 2-hr. labs.

Prereq.: Permission of chairman.

Required of phys. ed. majors.

Continuation of 131.

- a. Men.
- b. Women.

**133 U 2****Physical Education Activities**

Sp. 5 2-hr. labs.

Prereq.: Permission of chairman.

Required of phys. ed. majors.

Continuation of 132.

- a. Men.
- b. Women.

**208 U 2****Orientation to Physical Education**

A, W, Sp. 1 cl., 2 hrs. arr.

Consideration of personal competencies essential for effective teaching, research, recreation, coaching; investigation of areas of concentration; relationships to other disciplines.

**221 U 2****Sports Officiating**

2 cl., 2 lab. hrs.

Prereq.: Satisfactory evidence of playing skill in the elected athletic sport.

Repeatable to a maximum of 6 cr. hrs., subdivision not repeatable.

Study of playing rules, rule interpretation, techniques and mechanics of officiating various interscholastic and intercollegiate athletic sports.

**221.01 Baseball**

Sp.

**221.02 Basketball**

A, W.

Not open to students with credit for 222.

(Students completing the course are eligible for certification to officiate in Ohio schools.)

**221.04 Football**

A.

Not open to students with credit for 221.

(Students completing the course are eligible for certification to officiate in Ohio schools.)

**221.05 Gymnastics**

W.

**221.08 Field Sports**

A.

**221.12 Wrestling**

W.

(Students completing the course are eligible for certification to officiate in Ohio schools.)

**221.14 Volleyball**

A.

**221.15 Softball**

Sp.

**230 U 5**

**Nature of Human Movement**

A, W, Sp. 2 2-hr. cl., 1 2-hr. lab.

The study of human movement, including its organization, significance and cultural implications. Kleinman and Wardwell.

**231 U 1**

**Physical Education Activities**

A, W, Sp. 3 1-hr. labs.

Required of phys. ed. majors.

Cannot be repeated for credit.

These courses aim to develop knowledge, understandings, and skills in the basic activities appropriate to the teacher of physical education.

a. Men.

b. Women.

**232 U 1**

**Physical Education Activities**

A, W, Sp. 3 1-hr. labs.

Required of phys. ed. majors.

Cannot be repeated for credit.

Continuation of 231.

a. Men.

b. Women.

**233 U 1**

**Physical Education Activities**

A, W, Sp. 3 1-hr. labs.

Required of phys. ed. majors.

Cannot be repeated for credit.

Continuation of 232.

a. Men.

b. Women.

**236 U 3**

**Sport Notation**

Sp. 2 cl., 1 2-hr. lab.

Theory and techniques of Labanotation for the purpose of recording the movement in specialized sport skills.

**270 U 2**

**Supervision of Playground and Community Recreation Activities**

Sp. 2 2-hr. labs.

Programming of recreational activities relative to community conditions; overview of activities desirable for a broad, comprehensive program.

**271 U 3**

**Camp Counseling**

A. 2 cl., 7-day Sept. workshop

Sp. 2 2-hr. cl.

Prereq.: Phys. ed. major and minor students shall have completed the Sept. workshop immediately preceding the qtr. of enrollment.

(Spring qtr. section is open to all University students.)

Investigation of the responsibilities and duties of the counselor in various types of camps; practical experience in basic craft skills.

**289 U 2-5**

**Directed Field Experience**

Prereq.: Permission of division adviser.

Repeatable to a maximum of 20 cr. hrs.

**289.01 Introductory Experiences in a School System**

A, W, Sp.

For students seeking admission to professional status in physical education.

**289.06 Public Recreation**

Su, A, W, Sp.

For students in public recreation curriculum.

**289.07 Experience with Secondary School Programs**

A, W, Sp.

**289.08 Experience with Elementary School Programs**

A, W, Sp.

**289.09 Experience in Teaching of Sport and Dance in College Programs**

Su, A, W, Sp.

**323 U 3**

**Creative Physical Education for Elementary Teachers**

Su, A, W, Sp. 2 2-hr. labs.

Not open to students with credit for 541.

Theory of physical activities as a medium for creative self-expression; exploration of rhythmical, individual and group activities and their relation to development of children. Allenbaugh and Staff.

**360 U 5**

**Kinesiology**

A, W, Sp. 4 cl., 1 2-hr. lab.

Prereq.: Zool. 231, 232.

Not open to students with credit for 660.

The science of bodily movement. Bartels, Harper, Oyster, and Simonian.

**414 U 5**

**The Science of Development Through Activity**

A, W, Sp. 4 cl., 1 2-hr. lab.

Prereq.: 360, and Zool. 232.

Not open to students with credit for 214.

A systematic study of factors in human movement which affect the physiological development of the organism. Bartels and Fox.

420

**The Teaching of Athletic Sports**

A, W, Sp. 2 cl., 2 lab. hrs.

Prereq.: Satisfactory evidence of playing skill in the elected athletic sport.

Repeatable to a maximum of 9 cr. hrs.; subdivision not repeatable.

Study in the theory strategy and mechanics of coaching various interscholastic, intercollegiate athletic sports.

**420.01 Baseball**

a. Men.

b. Women.

Not open to students with credit for 547.

**420.02 Basketball**

a. Men.

b. Women.

Not open to students with credit for 519.

**420.03 Fencing**

a. Men.

b. Women.

**420.04 Football**

a. Men.

Not open to students with credit for 546.

**420.05 Gymnastics**

a. Men.

b. Women.

**420.06 Golf**

a. Men.

b. Women.

**420.07 Lacrosse**

a. Men.

b. Women.

**420.08 Soccer**

a. Men.

b. Women.

**420.09 Swimming**

a. Men.

b. Women.

Not open to students with credit for 549.

**420.10 Tennis**

a. Men.

b. Women.

**420.11 Track and Field**

a. Men.

b. Women.

Not open to students with credit for 544.

**420.12 Wrestling**

a. Men.

**420.13 Ice Hockey**

a. Men.

**420.14 Volleyball**

430

U 2

**Basic Movement**

Sp. 1 cl., 1 2-hr. lab.

Prereq.: 230.

The study and practice of basic movement as a category of activity in the physical education instructional program. Siedentop.

441

U 5

**Motor Learning**

A, W, Sp. 3 2-hr. cl.

Prereq.: Recommended 360, Psychol. 230, and Zool. 232.

Study of major variables affecting the learning process as related to the acquisition of motor skills; major attention given to factors in the educational environment which teachers may control.

460

U 5

**Kinesiology for Dancers**

Sp. 4 cl., 1 2-hr. lab.

Prereq.: 10 cr. hrs. in biological sciences.

Scientific study of dance movements, including analysis of joints; physiological basis of conditioning; common injuries; maturation and technical development; equilibrium; control of force and speed. Oyster.

530

U 2

**The Administration of Interscholastic Athletics**

A, Sp. 2 cl.

An introductory course in athletic administration, including scheduling contests, records, eligibility, contest management, facilities and equipment, budgets and finance, public relations, and awards. Coates.

540

U 5

**Historical Foundations of American Physical Education**

A. 5 cl.

An historical survey of the origins and development of modern physical education in America, including individual leaders and contributing factors. B. Bennett.

541

U 5

**Physical Education for the Elementary School Child**

A, W, Sp. 2 cl., 3 2-hr. labs.

Prereq.: 230, and Psychol. 230.

The study of content, program design and teaching techniques appropriate to the elementary school child. Allenbaugh, Breiner, and Hewlett.

586

U 6-9

**Elementary School Student Teaching**

A, W, Sp.

Prereq.: 4th yr. standing.

A minimum of 15 cr. hrs. required in student teaching 586 and/or 587.

Observation, participation, and responsible teaching in a public school; individual and group conferences or seminars.

Students desiring teaching in more than one area should indicate accurately both section numbers and hours in each.

**586.07 Physical Education (Men)****586.08 Physical Education (Women)**

587

U 6-15

**Student Teaching in Secondary Schools**

A, W, Sp.

Prereq.: 4th yr. standing.

A minimum of 15 cr. hrs. required in student teaching 586 and/or 587.

Observation, participation, and responsible teaching in a public school; individual and group conferences or seminars.

Students desiring teaching in more than one area should indicate accurately both section numbers and hours in each.

587.07 Physical Education (Men)

587.08 Physical Education (Women)

## 594 U 2

### Group Studies in Physical Education

A, W, Sp. 2 cl.

Prereq. or concur.: 586 or 587.

Consideration of present and changing concepts of physical education.

594.30 Application of Science to Physical Education

A.

594.31 Elementary School Physical Education

Sp.

594.32 Secondary School Physical Education

A, Sp.

## 621 U G 5

### Principles of Physical Education

Su, A, W, Sp. 5 cl.

Prereq.: Major or minor in phys. ed., or permission of instructor.

Origins and nature of modern physical education as developmental experience and medium of education; contributions to organic growth, personal resources, and growth in social relationships. Mand and Nelson.

## 630 U G 2

### Problems in Intramural Sports

Su, A, Sp. 2 cl.

A critical analysis of intramural sports programs; problems of policy and administration of programs on the elementary, secondary and college levels will be studied. Beekman.

## 631 U G 2

### Advanced Skill Techniques

4 1-hr. labs.

Prereq.: Placement examination by audition, and permission of instructor.

Repeatable to a maximum of 10 cr. hrs. Subdivisions may not be repeated.

Advanced techniques of performance and a specialized and intense study of appropriate technical literature.

631.01 Baseball

Sp.

631.02 Basketball

A.

631.05 Gymnastics

A, W.

631.06 Golf

A.

631.08 Field Sports

Sp.

631.09 Swimming and Scuba

A, W.

631.10 Tennis

A, Sp.

631.14 Volleyball

Sp.

631.15 Softball

A.

631.16 Advanced Recreational Dance

W.

631.17 Squash and Badminton

Sp.

## 640 U G 3

### History of Health Education and Physical Education

Su, W. 3 cl.

An historical survey of physical and health education beginning with ancient Greece and with special emphasis on recent and contemporary developments in Europe and America. Bennett.

## 642 U G 3

### Organization and Administration of Physical Education

Su, A, W. 3 cl.

Prereq.: 621, or equiv.

Study of policies and procedures in the organization and administration of the physical education program. Brainer.

## 647 U G 3

### Physical Education for Secondary School Youth

Prereq.: Satisfactory proficiency in 231-233 inclusive, or equiv.

Emphasis on the study of needs, interests, and abilities of secondary school youth, and methods and materials for the conduct of appropriate sports activities. C. Bennett and Hendrix.

a. Men.

Su, A, W, Sp. 2 cl., W. Field Experience, 4 hrs.

b. Women.

Su, A, W, Sp. 2 cl., W. Field Experience, 4 hrs.

## 648 U G 3

### Physical Education for Senior High School Youth

Su, A, Sp. 3 2-hr. cl.

Prereq.: 231-233 inclusive, or equiv.

Continuation of 647 with emphasis on the characteristics of the middle adolescent as they affect the selection and conduct of physical education activities. Nelson.

## 650 U G 3

### Evaluation in Physical Education

Su, A, W, Sp. 2 cl., 1 2-hr. lab.

A critical study of methods in evaluating biological, social, and psychological outcomes for physical education. Mathews and Morris.

## 661 U G 5

### First Aid and Care of Injuries

Su, A, W, Sp. 3 cl., 2 2-hr. labs.

Prereq.: 360, or equiv.

Students completing this course are eligible for Red Cross standard or advanced certification in first aid.

A consideration of the methods of prevention and care of injuries, conditioning of athletes and safety provisions for the conduct of physical education. Hart.

**662 U G 3****Adapted Physical Education**

Su, A, W, Sp. 2 cl., 1 3-hr. lab.

Prereq.: 360, 541, and 647.

The organization and administration of individual physical education for typical and atypical students including the child with a physical or learning disability; laboratory experience with the atypical. Ersing and Wheeler.

**690 U G 4****Physical Education Workshop**

Su. 3-wk. workshop.

Prereq.: Teaching experience or senior standing in Phys. Ed., and permission of instructor.

Repeatable to a maximum of 8 cr. hrs.

A team approach to activity teaching in physical education with emphasis on instruction, methods, materials, resources, evaluation, inter-relationships, and others.

**693 U G 1-4****Individual Studies in Physical Education**

Su, A, W, Sp.

Prereq.: Grad. or senior standing, and permission of adviser.

Investigation of selected professional problems.

**694 U G 1-5****Group Studies in Physical Education**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Group studies on special problems in Physical Education.

**731 U G 3****Concepts of the Body in Physical Education**

Su, W. 3 cl.

Study of the conceptions of the body that have influenced contemporary views of physical education and its practice. Kleinman.

**751 U G 3****Physical Growth and Motor Development**

Su, A. 3 cl.

Prereq.: Grad. standing, or permission of instructor.

Study of growth in phylogenetic and ontogenetic sequence; motor development; critical analysis of research in motor ability, fitness, and athletics, as related to growth and development. Mordy.

**760 U G 3****Mechanical Analysis of Motor Skills**

A. 3 cl.

Prereq.: 360 or equiv., and Physics 111, or permission of instructor.

The application of mechanical laws, principles, and formulae to motor skills. Simonian and Bartels.

**770 U G 3****Outdoor Education and Camp Administration**

A, Sp.

Prereq.: 271, or permission of instructor.

Introduction to the principles, status, and administration of outdoor education and camping. Mand.

**771 U G 3****Public Recreation: Its Organization and Administration**

A, W, Sp. 3 cl.

Prereq.: Soc. 465, or equiv.

Consideration of common patterns of organization of community recreation found in American cities, large and small, under municipal, school, and other auspices.

**820† G 3****Principles of Football Coaching and Management**

Su. 3 cl.

Prereq.: Grad. standing, and coaching experience.

A course for advanced students of football considering the principles of various types of strategy; the designing of plays, methods of teaching and controlling players, and special problems of management. Hayes.

**830 G 3****Problems in Interscholastic and Intercollegiate Athletics**

Su, W. 3 cl.

The relation of athletics to education; problems of athletic organization; eligibility; finance, current trends and developments in management and purpose; public relations. Mordy.

**831 G 3****Professional Preparation of Teachers in Physical and Health Education**

Su, Sp. 3 cl.

Principles underlying professional preparation of teachers in physical and health education; curriculum construction; selection of candidates; supervised teaching; staff personnel; problems pertaining to professional students. Hess.

**832 G 3****Human Movement Theory in Physical Education**

Su, Sp. 3 cl.

A study of the several theoretical conceptions of human movement and their implications for physical education and dance. Kleinman.

**840 G 3****Comparative Physical Education and International Sport**

Su, Sp. 3 cl.

A survey of contemporary physical education in selected countries with some attention given to international competition in sports. B. Bennett.

**841 G 3****Physical Education in School and College**

Su, A. 3 cl.

Kleinman.

**842 G 3****Seminar in the Role of Sports in Society**

Su, Sp. 3 cl.

Prereq.: Soc. 465, or equiv.

Study of the significance of sports in society; and examination of the extent to which sports contribute to human welfare. Mordy.



**845 G 3****Statistics for Physical Education and Health Education**

Su, A, W. 3 cl.

Prereq.: 650; Math. 116, 121, or 125; and permission of instructor.

A study of techniques for interpreting research publications in the field, and of statistical procedures useful in analyzing data. Fox and Mathews.

**850 G 3****Survey of Research in Physical Education**

Su, Sp. 3 cl.

Prereq.: 885, or equiv.

Mathews and Morris.

**851 G 3****Motor Learning**

Su, W. 2 1½-hr. cl.

Prereq.: 441 or equiv., Psych. 600, or permission of instructor.

Critical consideration of research and theory in the acquisition of skill. Special attention is given to major trends in the field. Siedentop.

**860 G 5****Organic Science as Applied to Physical Education and Health Education**

Su, Sp.

Prereq.: 10 cr. hrs. physiol., 10 cr. hrs. chem., and 10 cr. hrs. biol., or equiv.

A study of the integration of chemistry, biology, anatomy, physiology to the field of physical education and health education.

**880 G 3****Supervision of Physical and School Health Education**

Su, A. 3 cl.

A study of the responsibilities and functions of the supervisor in city, county, and state school systems.

**881 G 3****Areas and Facilities in Physical Education**

Su, A. 3 cl.

Principles and techniques in determining facility needs, evaluating facilities, planning for new construction and remodeling the areas and facilities for physical education and recreation. Hess and Coates.

**885 G 3****Methods of Research in Health Education and Physical Education**

Su, W, Sp. 3 cl.

Prereq.: 845.

To develop some competency in professional writing and in the use of various research methods applied to health education and physical education. Fox, Mathews, and Morris.

**994 G 3****Problems in Physical Education**

Advanced problems in physical education, individual or group participation.

**994.01 Recreation**

A.

**994.02 Adapted Physical Education**

W.

**994.03 Curriculum in Physical Education**

Su, Sp.

**994.04 Physical Education in Higher Education**

A.

**994.05 Physical Education in Secondary Education**

Sp.

**994.06 Physical Education in Elementary Education**

W.

**994.07 School Evaluation****994.08 Administration**

Su.

**995 G 2****Seminar in Physical Education**

Su, W. 2 cl.

**996 G 2****Seminar in Recreation**

Sp. 2 cl.

**999 G Arr.****Research in Physical Education**

Su, A, W, Sp.

Research for thesis or dissertation purposes only.

## Physical Medicine

Office: 1012 Dodd Hall, 472 West 8th Avenue

**Professors** Johnson (Chairman), Nagi, and Stow;  
**Associate Professors** Earl, Gibson, Guyton, Hamilton, Maclean, Melvin, Spiegel, and Waylonis; **Assistant Professors** Checkles, Materson, Morgan, Powers, Timms, Wolfe, and Wood.

**715 P 1****Medical Rehabilitation**

1 month, offered Oct. and Feb.

Prereq.: Med. 4th yr. standing.

Ambulation aids, electrodiagnosis, prosthetics, physical and occupational therapy, social service, as related to acute and chronic diseases. Johnson and Staff.

**735 P 6, 12, 18****Clinical Physical Medicine and Rehabilitation**

1, 2, or 3 months; offered all months.

Prereq.: Permission of instructor.

Ward experience in restorative procedures on individuals with severe chronic disabilities. Guyton, Melvin, Johnson, Spiegel, MacLean, Checkles, Waylonis, Earl, Materson, Powers, and Wood.

**736 P G 3****Clinical and Physiologic Bases of Physical Treatment**

Sp.

Prereq.: Permission of instructor.

The indications for, and choice of, physical modalities. Stow and Johnson.

**745 P 6, 12, 18****Biophysical Basis of Physical Treatment**

1, 2, or 3 months; offered all months.

Prereq.: Permission of instructor.

The student will design and complete a laboratory or library research problem involving the biophysical aspects of physical diagnosis or treatment. Johnson, Stow, and Melvin.

**750 P G 3****The Natural History of Disability**

A. 3 1-hr. cl.

Prereq.: Grad. or professional registration and permission of instructor.

An analysis of the nature and patterns of disability, the processes involved, and the factors influencing its course. Hamilton and Staff.

**770 P G 3****Instrumentation, Neurophysiology, Clinical Aspects of Electromyography**

W.

Prereq.: Resident standing and permission of dept. chairman.

In-depth study of the instrumentation and correlation of neurophysiology and clinical aspects of electromyography, including excitable membranes, biological potentials, and nerve stimulation in clinical disorders. Melvin, MacLean, and Stow.

**799 P 18****Residency in Physical Medicine**

Su, A, W, Sp.

12 months full time, beginning July 1.

Prereq.: Appointment as resident, University Hospitals.

Repeatable to a maximum of 216 cr. hrs.

Rotation through physical medicine and rehabilitation clinical inpatient and outpatient services; consultative, supervisory, and teaching responsibilities in the patient-care team; rounds, conferences, seminars. Johnson, Guyton, Spiegel, Melvin, MacLean, Checkles, Earl, Materson, Waylonis, and Powers.

**993 G 3-5****Individual Studies in Physical Medicine**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to 15 cr. hrs.

Minor investigations using electrodiagnostic techniques; biophysical, physiologic, and therapeutic effects of physical agents, and other medical rehabilitation techniques. Johnson, Stow, Timms, Melvin, and Checkles.

**999 G Arr.****Research in Physical Medicine and Rehabilitation**

Su, A, W, Sp.

Research for thesis purposes only.

**Physical Therapy**

(School of Allied Medical Professions)

Office: 306 School of Allied Medical Professions Building, 1583 Perry Street

Associate Professor Woods (Division Director); Professor E. Johnson; Associate Professors Burnett, Chase, and Downer; Assistant Professors Chidley and Pierson; Instructors Allen and Starks; Clinical Instructors Cotzin, Holland, D. Johnson, Tootle, and Trostmler.

**480 U 3****Procedures I**

A, W. 3 cl., 1 3-hr. lab.

Prereq.: Admission to Phys. Ther.

Not open to students with credit for 301 and 302.

Professional orientation: introduction to the hospital setting and patient care; principles and techniques of basic body mechanics; bandaging and therapeutic massage. Woods.

**481 U 5****Procedures II**

A, W. 4 cl., 2 2-hr. lab.

Prereq.: 480, or 301 and 302.

Not open to students with credit for 402 and 416.

Agents used in physical therapy: mechanical and physical properties; therapeutic application and physiological effects related to patients. Downer.

**482 U 3****Procedures III**

Sp. 1 cl., 2 2-hr. lab.

Prereq.: 481, or 402 and 416 or admission to Oc. Ther.

Not open to students with credit for 303.

Evaluation techniques and their usage in physical therapy, posture evaluation, goniometric range of motion recordings, manual muscle testing, functional tests and measurements. Downer.

**495 U 3****Medical Kinesiology**

W. 2 cl., 1 2-hr. lab.

Prereq.: Admission to School of Allied Medical Professions and permission of instructor.

Not open to students with credit for 303 or 304.

Biomechanics and pathomechanics in the analysis of human motion; emphasis on clinical relationships. Burnett.

**521 U 2 or 3****Medical Science I**

A. 2 or 3 cl.

Prereq.: Admission to School of Allied Medical Professions.

Principles, clinical aspects, and therapeutic procedures related to selected medical specialties.

**522 U 2 or 3****Medical Science II**

W. 2 or 3 cl.

Prereq.: Admission to School of Allied Medical Professions.

Lectures and clinical presentations giving an orientation to signs, symptoms, and therapeutic management of patients in related medical science fields. Chidley.

**541 U 4**  
**Therapeutic Exercise I**

A. 3 cl., 2 2-hr. lab.

Prereq.: Admission to Phys. Ther.

Not open to students with credit for 310.

Basic principles and techniques of therapeutic exercise related to physical and medical sciences.

**542 U 4**  
**Therapeutic Exercise II**

W. 3 cl., 2 2-hr. lab.

Prereq.: Permission of instructor.

Not open to students with credit for 407.

Rehabilitation procedures for maximum restoration of the disabled; functional relationships and principles associated with functional exercise and specialized equipment. Pierson.

**543 U 4**  
**Therapeutic Exercise III**

Sp. 3 cl., 2 2-hr. lab.

Prereq.: Permission of instructor.

Not open to students with credit for 405.

Theory and technique of exercise for the neurologically handicapped with carry-over into all areas of disability; integration and correlation of therapeutic exercise approaches. Chidley.

**585 U 3**  
**Physical Therapy Clinical Coordination**

W. 2 cl., 2 2-hr. lab.

Prereq.: 542 or 407.

Not open to students with credit for 485.

Coordination and summary practice of all physical therapy procedures, being determined by the patient diagnosis and medical prescriptions; treatment, records, charts, methods of evaluating and reporting, and clinical affiliation planning. Pierson.

**588 U 5**  
**Professional Administration in Physical Therapy**

Sp. 3 cl., 2 2-hr. lab.

Prereq.: Permission of instructor.

Integration of theory and professional practice involving administration and supervision skills including interpersonal relationship concepts, oral and written communication analysis, and professional responsibilities and introductory research. Woods.

**595 U 1-3**  
**Seminar**

Su, A, W, Sp. 1-3 cl.

Prereq.: Permission of instructor.

Not open to students with credit for 485.

Repeatable to a maximum of 9 cr. hrs.

Conferences, group discussions, and presentations of selected topics. Staff.

**597 U 6**  
**Clinical Education**

Su, A, W, Sp. 8 hrs. per day; 5 days per wk. for 3 months.

Prereq.: Permission of instructor and completion of all required physical therapy professional courses in the curriculum.

Clinical experience in the application of physical therapy techniques under supervision of physical therapists in hospital, community, and other selected facilities. Pierson.

## Physics

Office: 1012 Alpheus Smith Laboratory of Physics, 174 West 18th Avenue

**Professors** Jossem (Chairman), Arns, Bell, Brown, Dickey, Edwards, Gaines, Hausman, Heer, Jastram, Korringa, Lande (Emeritus), Mills, Nelson, Neilsen, Pool (Emeritus), Prebus, Rao, Reibel, Romanowski, Shaffer, Shaw, Tanaka, Wada, Wigen, and Yaqub; **Associate Professors** Blatt, Donoghue, Erickson, Harris, Kim, Kurbatov (Emeritus), Mulligan, Ploughe, Reay, Riley, Seyler, Tough, and Yang; **Assistant Professors** Brim (Lima), Ebner, Garland, Hopps, Palmer, Plummer (Newark), Saam, Schwartz, Scott (Mansfield), Stanton, and Stroud.

**100 U 5**  
**Physics and Man**

Su, A, W, Sp.

Repeatable to a maximum of 10 cr. hrs. with permission of Department.

An introduction to the physics of the world of everyday experience through the study of selected topics.

**101 U 5**  
**Nature of the Physical World**

A, Sp. 4 cl., 1 2-hr. lab.

An elementary description of the physical world emphasizing scientific method and contemporary viewpoints; laboratory work and demonstrations.

**102 U 5**  
**Nature of the Physical World**

W. 4 cl., 1 2-hr. lab.

Prereq.: 101.

Continuation of 101.

**111 U 5**  
**General Physics: Mechanics and Heat**

Su, A, W, Sp. 4 cl., 1 2-hr. lab.

Prereq.: Eligibility for Math. 150.

**112 U 5**  
**General Physics: Electricity, Magnetism, and Light**

Su, A, W, Sp. 4 cl., 1 2-hr. lab.

Prereq.: 111.

**113 U 5**  
**General Physics: Modern Physics**

Su, A, W, Sp. 4 cl., 1 2-hr. lab.

Prereq.: 112.

**131 U 5**  
**Introductory Physics: Particles, Motion**

A, W, Sp. 5 cl., 1 2-hr. lab.

H131 (Honors) may be available to students enrolled in a college Honors Program or by permission of dept.

Prereq.: 1 entrance unit of physics or chem.; prereq. or concur. Math. 151.

Not open to students with credit for 231.

A presentation of the major concepts of physics from a contemporary point of view, for students majoring in physical sciences, mathematics, or engineering.

**132 U 5****Introductory Physics: Waves, Quanta**

Su, A, W, Sp. 5 cl., 1 2-hr. lab.

H132 (Honors) may be available to students enrolled in a college Honors Program or by permission of dept.

Prereq.: 131 and Math. 151; prereq. or concur. Math 152.

Not open to students with credit for 232.

Continuation of 131.

**133 U 5****Introductory Physics: Particle Systems, Electrodynamics**

Su, A, W, Sp. 5 cl., 1 2-hr. lab.

H133 (Honors) may be available to students enrolled in a college Honors Program or by permission of dept.

Prereq.: 132 and Math. 152; prereq. or concur. Math. 153, or permission of instructor.

Not open to students with credit for 233.

Continuation of 132.

**194 U 1-6****Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Course designed to permit groups of students the opportunity to pursue special studies not otherwise offered.

**241 U 3****Physical Phenomena**

A, Sp. 3 cl.

Prereq.: 133 or equiv.; Math. 153; prereq. or concur. Math. 254.

Not open to students with credit for 541.

A study of gases, liquids, and solids illustrating the connection between measurements (mechanical, macroscopic) and models (statistical, microscopic) of the properties of matter in bulk.

**251 U 3****The Development of Quantum Physics**

Su, A, W, Sp. 3 cl.

Prereq.: 133 or equiv.; Math. 153; prereq. or concur. Math. 254.

Not open to students with credit for 551 or 580.01.

Quantum physics, introduced through a study, in historical perspective, of the crucial ideas and experiments that led to the modern conception of the atom.

**435 U 3****Intermediate Geometrical Optics**

W. 3 cl.

Prereq.: 111, 112, 113, and Math. 151.

For optometry students.

Ray optics of thick lenses, mirrors, prisms, and their combination; apertures and aberrations.

**436 U 3****Intermediate Physical Optics**

Sp. 3 cl.

Prereq.: 111, 112, 113, and Math. 151.

For optometry students.

Wave theory of optical phenomena; applications.

**437 U 2****Geometrical Optics Laboratory**

W. 1 4-hr. lab.

Prereq. or concur.: 435 or 535.

For optometry students.

Selected experiments in geometrical optics.

**438 U 2****Physical Optics Laboratory**

Sp. 1 4-hr. lab.

Prereq. or concur.: 436 or 636.

For optometry students.

Selected experiments in physical optics.

**501 U G 3****Descriptive Acoustics**

A. 3 cl.

Prereq.: Junior standing in music, speech communication, science education or permission of instructor.

Not open to physics majors.

Descriptive non-mathematical treatment of acoustics with applications to music and speech including sources, propagation, reception, characteristics of sound; room acoustics; hearing; apparatus.

**503 U G 5****General Meteorology**

Sp.

Prereq.: Either 111, 131, or permission of instructor.

Not open to students with credit for 120.

A description of weather phenomena and the physical processes underlying them; intended primarily for nonphysics majors.

**516 U G 4****Intermediate Physics Laboratory**

Su, A, W, Sp. 2 3-hr. labs.

Prereq.: 113 or 133 or permission of instructor.

Not open for grad. credit to students majoring in physics.

Repeatable to a maximum of 12 cr. hrs.

Selected intermediate level experiments from basic areas of physics.

**525 U G 4****Dynamical Models I**

Su, A, Sp. 4 cl.

Prereq.: 133 and Math. 255 or equiv.

Not open to students with credit for 521.

Dynamical models of particle motion; behavior of linear systems; periodic and transient phenomena in mechanical and electrical systems; central force problems; frames of reference.

**555 U G 4****Fields and Waves I**

W. 4 cl.

Prereq.: 525 or equiv. prereq. or concur. Math. 551.

Not open to students with credit for 531.

Introduction to the description of electrostatic fields; dielectrics; boundary-value problems.

**580 U G 3****Topics in Physics**

Su, A, W, Sp. 3 cl.

Prereq.: 525 or permission of instructor.

Introductory treatment of phenomena and elementary theory of contemporary areas of physics.

**580.01 Introduction to Modern Physics**

A, Sp.

Not open to students with credit for 251, 472, 551, or 705.

**580.05 Introduction to Nuclear Physics**

A, Sp.

Prereq.: 580.01 or permission of instructor.

Not open to students with credit for 571.

**580.06 Introduction to Solid State Physics**

Sp.

Prereq.: 580.01 or permission of instructor.

Not open to students with credit for 661.

**580.11† Physics of the Upper Atmosphere**

A.

Prereq: 580.01 or permission of instructor.

Not open to students with credit for 651.

**580.20 Special Topics**

Prereq.: 580.01 or permission of instructor.

Repeatable to a maximum of 9 cr. hrs.

**593 U G 2-5****Individual Studies in Physics**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Independent reading, study, or laboratory work at an intermediate level.

**594 U G 1-6****Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Intermediate level group studies on special topics.

**595 U 1****Seminar**

Su, A, W, Sp.

Prereq.: 131, 132, 133, and Math. 254 or equiv.

Repeatable to a maximum of 6 cr. hrs.

Discussion of special topics with student participation in the presentation of material.

**616 U G 4****Advanced Physics Laboratory**

Su, A, W, Sp. 2 3-hr. labs.

Prereq.: 241, 251, 525, 555, or permission of instructor.

Repeatable to a maximum of 24 cr. hrs.

Experiments selected from all areas of physics; independent work emphasized.

**617 U G 5****Electronics for Physicists**

A, W, Sp. 2 cl., 2 3-hr. labs.

Prereq.: 525.

An intensive introduction to electronic circuits, devices, and instrumentation with emphasis on laboratory experience.

**626 U G 4****Dynamical Models II**

Su, W. 4 cl.

Prereq.: 525; prereq. or concur. Math. 551.

Not open to students with credit for 621.

Continuation of 525 with development of generalized coordinate representations and equations of motion; systems of particles; coupled systems; wave dynamics.

**627 U G 4****Dynamical Models III**

Sp. 4 cl.

Prereq.: 626 and Math. 551.

Continuation of 626 with emphasis on systems of particles; classical statistical mechanics and kinetic theory.

**656 U G 4****Fields and Waves II**

Sp. 4 cl.

Prereq.: 555 or equiv.

Continuation of 555; magnetic fields of steady currents; induction; Maxwell's equations; plane waves; special relativity.

**657 U G 4****Fields and Waves III**

A. 4 cl.

Prereq.: 656 or equiv.

Not open to students with credit for 636.

Continuation of 656; plane waves in matter; physical optics; coherence, interference, diffraction, and dispersion.

**670 U G 1-15****Physics for In-Service Teachers**

Su, A, W, Sp.

Prereq.: 15 cr. hrs. of Physics and teaching experience; permission of instructor.

Intended for secondary school science teachers.

Repeatable to a maximum of 30 cr. hrs.

A course to deepen teachers' understanding of basic physical concepts and methods of treatment of selected topics; includes lectures, discussions, demonstrations, and individualized laboratory work.

**693 U G 1-15****Individual Studies**

Su, A, W, Sp.

Prereq.: Satisfactory advanced courses in experimental and theoretical physics and permission of instructor.

Repeatable to a maximum of 30 cr. hrs.

A course designed to give a properly qualified student opportunity for independent reading, study, or laboratory work in a specialized field of interest.

**694 U G 1-6****Group Studies**

Su, A, W, Sp.

Prereq.: Satisfactory advanced courses in experimental and theoretical physics and permission of instructor.

Repeatable to a maximum 15 cr. hrs.

Gives groups of students an opportunity to pursue special studies not otherwise offered.

**705 U G 4****Structure of Matter I**

Su, A. 4 cl.

Prereq.: 251, 626, 656, or equiv. and Math. 255 and 551, or equiv.

Not open to students with credit for 727.

Quantum phenomenology; Schrodinger formulation of quantum mechanics; applications to simple systems; one-electron atoms.

**706 U G 4****Structure of Matter II**

W. 4 cl.

Prereq.: 705 or equiv.

Not open to students with credit for 728.

Continuation of 705; magnetic moments and spin; identical particles; many-electron atoms; molecular structure and spectra.

**707 U G 4****Structure of Matter III**

Sp. 4 cl.

Prereq.: 706 or equiv.

Continuation of 706; quantum statistics; band theory of solids; interaction of radiation with matter; nuclear and elementary-particle physics.

**735 U G 3****Electromagnetic Theory of Light**

Sp. 3 cl.

Prereq.: Permission of instructor.

Mathematical treatment of physical optics.

**743 U G 4****Thermodynamics**

A. 4 cl.

Prereq.: 241 and 627 or equiv.

Modern treatment of topics in physical thermodynamics including entropy, specific heats, third law, and change of phase.

**780 U G 3****Topics in Contemporary Physics**

Su, A, W, Sp. 3 cl.

Prereq.: 705 or permission of instructor.

Experimental and theoretical aspects of areas of current interest in physics.

**780.01† Atomic Spectra and Structure**

Not open to students with credit for 751.

**780.02† Elementary Particles**

Sp.

**780.03† Low-Temperature Physics**

Not open to students with credit for 744.

**780.04 Molecular Spectra and Structure**

W.

Not open to students with credit for 757.

**780.05 Nuclear Physics**

Sp.

Not open to students with credit for 771.

**780.06 Solid State**

A.

Not open to students with credit for 761.

**780.07 Plasma Physics**

A.

Not open to students with credit for 775.

**780.09† X-ray Physics**

Not open to students with credit for 753.

**780.20† Special Topics****795 U G 1****Special Topics Seminar**

A, W.

Prereq. or concur.: 705.

Repeatable to a maximum of 3 cr. hrs.

A survey of current research problems in physics.

**801 G 1****Seminar in Physics**

Su, A, W, Sp.

Prereq.: Acceptable specialized courses and permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Seminars will be conducted by various members of the staff on topics of current interest in their fields of specialization; students will participate in the presentation and discussion of material.

**816 G 3-6****Topics in Physics**

Su, A, W, Sp.

Prereq.: 616 or equiv. and permission of instructor.

Repeatable to a maximum of 30 cr. hrs.

Laboratory and/or theoretical work on an individual basis on topics of current interest.

**821 G 4****Advanced Dynamics I**

A. 4 cl.

Prereq.: 626 or permission of instructor.

Generalized coordinates, Lagrange's equations, variational principles, linear transformation theory, normal coordinates, small oscillations, Hamilton's equations, and canonical transformations.

**822 G 4****Advanced Dynamics II**

W. 4 cl.

Prereq.: 821.

Hamilton-Jacobi theory, tensor algebra and analysis, dynamics of classical fields, elasticity, and hydrodynamics.

**827 G 5****Quantum Mechanics I**

A. 5 cl.

Prereq.: 706 or permission of instructor.

Systematic treatment of wave mechanics; symmetries and conservation laws, eigenvalues and eigenfunctions of linear operators, separation of variables, soluble examples, central field problem, angular momentum.

**828 G 5****Quantum Mechanics II**

W. 5 cl.

Prereq.: 827.

Theory of scattering, Born approximation; stationary state perturbation theory, WKB approximation, variational method and applications; linear vector spaces, transformations, symmetries.

**829 G 5**  
**Quantum Mechanics III**

Sp. 5 cl.

Prereq.: 828.

Time dependent perturbations; applications to scattering and electromagnetic transitions; Pauli spin theory; applications to hydrogen; addition of angular momenta; reflections in space and time.

**830 G 4**  
**Quantum Mechanics IV**

A. 4 cl.

Prereq.: 829.

Systems with several electrons, exclusion principle; applications to atoms and molecules, and to scattering; Hartree-Fock approximation; Dirac equation for free electrons and for hydrogen.

**831 G 4**  
**Advanced Quantum Mechanics**

W. 4 cl.

Prereq.: 830.

Symmetry groups; Lorentz transformations; field quantization; S-matrix theory; general perturbation theory.

**834 G 4**  
**Electromagnetic Field Theory I**

A. 4 cl.

Prereq.: 656 or equiv.

Static electric fields, static and stationary magnetic fields, dielectrics, magnetized bodies; boundary value problems, vector and scalar potential functions; and energy in electric and magnetic fields.

**835 G 4**  
**Electromagnetic Field Theory II**

W. 4 cl.

Prereq.: 834 or permission of instructor.

Maxwell's equations, gauge transformations; superposition, polarization, dispersion and refraction of plane electromagnetic waves; special relativity, covariant formulation of particles and fields, and conservation laws.

**836 G 4**  
**Electromagnetic Field Theory III**

Sp. 4 cl.

Prereq.: 835 or permission of instructor.

Radiating systems and diffraction; radiation by moving charges, bremsstrahlung; multipole fields, radiation damping, and scattering and absorption of charged particles.

**847 G 4**  
**Statistical Mechanics I**

W. 4 cl.

Prereq.: 743, 707 or 828 or permission of instructor.

Ensembles in classical and quantum statistical mechanics; density matrix, degenerate Fermi gas; Debye theory of specific heat; black-body radiation; Bose-Einstein condensation.

**848 G 4**  
**Statistical Mechanics II**

Sp. 4 cl.

Prereq.: 847.

Cluster and virial expansions; phase transitions; Boltzmann equation and H theorem; transport coefficients; fluctuations and Brownian motion; Onsager relations.

**880 G 3**  
**Advanced Topics**

A, W, Sp. 3 cl.

Prereq.: 828 or permission of instructor.

Repeatable to a maximum of 9 cr. hrs. in each decimal subdivision.

A systematic advanced treatment of areas of current interest in physics; topics will be announced each quarter.

- 880.01 Atomic Spectra and Structure**
- 880.02 Elementary Particle Physics**
- 880.03 Low-Temperature Physics**
- 880.04 Molecular Spectra and Structure**
- 880.05 Nuclear Physics**
- 880.06 Solid State**
- 880.08 Theory of Quantized Fields**
- 880.20 Special Topics**

**999 G Arr.**  
**Research in Physics**

Su, A, W, Sp.

Research for thesis or dissertation purposes only.

## Physiological Chemistry

Office: 5170 Graves Hall, 333 West 10th Avenue

**Professors** Cornwell (Chairman), Allen, Brierley, Devor, Frajola, Kruger, Merola, Richardson, Sprecher, and Wikoff (Emeritus); **Associate Professors** Alben, Gruemer, Horrocks, Newman, Nuenke, Rieske, and Webb; **Assistant Professors** Addanki, Boggs, Clendenon, Eyring, Griesen, Klapper, Matthews, Mayer, Mekhjian, Och, Panganamala, and Scott.

**311 U 4**  
**Physiological Chemistry**

A. 4 cl.

Prereq.: Chem. 102 or 122 and enrollment or intended enrollment in a program of the School of Allied Medical Professions.

Human biochemistry with emphasis on metabolism and applications to clinical chemistry and human nutrition; pertinent organic chemistry will be included. Devor and Staff.

**312 U 4**  
**Physiological Chemistry**

W. 4 cl.

Prereq.: 311.

A continuation of 311. Devor and Staff.

**611 U G 3****Physiological Chemistry**

W. 3 cl.

Prereq.: Chem. 242, 244, or 253, 254 or equiv.; open to undergraduates with permission of instructor. (Course designed primarily for grad. students in medical and biological sciences.)

Chemistry and metabolism of carbohydrates, proteins, lipids, and nucleic acids; basic principles of enzymes, control mechanisms, digestion and absorption. Merola, Sprecher, and Staff.

**612 U G 3****Physiological Chemistry**

Sp. 3 cl.

Prereq.: 611.

Continuation of 611. Merola, Sprecher, and Staff.

**613 U G 3****Physiological Chemistry Laboratory**

Sp. 1 cl., 2 3-hr. lab.

Prereq.: One qtr. of general biochem. or physiol. chem.

Laboratory experiments illustrating principles of biochemistry and acquainting the students with the major experimental techniques of current biochemistry. Rieske and Staff.

**636 U G 3****Quantitative Problems in Biochemistry**

W. 3 cl.

Prereq.: Elementary physical chemistry and biochemistry, or permission of instructor.

Application of elementary physical chemical concepts to the quantitative analysis of biochemical data. Rieske.

**641 P 4****Dental Biochemistry**

Su. 3 cl., 1 conf.

Prereq.: Enrollment in the College of Dentistry, Chem. 241, 242, and either Chem. 243, 244, or Chem. 245, 246. Chemistry and metabolism of carbohydrates, lipids, and proteins; digestion and absorption; elements of nutrition as they relate to dentistry, especially mineral and bone metabolism. Scott and Staff.

**642 P 4****Dental Biochemistry**

A. 3 cl., 1 conf.

Prereq.: 641 and enrollment in the College of Dentistry.

Continuation of 641. Scott and Staff.

**701 P 6****A Biochemical Approach to the Study of Disease**

1 month, offered Jan. and May.

Prereq.: Permission of instructor.

Subcellular organization, model systems in disease, injury and inflammation, toxic agents, deficiency states, genes, enzymes and disease, biochemical changes in growth.

**705 U G 5****General Biological Chemistry**

A. 3 cl.

Prereq.: Chem. 242, 244 or 253, 254 or equiv.; physical chem. background of kinetics and thermodynamics, or permission of instructor.

Not open to students with credit for Biochem. 611 or 705.

(Cross-listed in Biochemistry and Molecular Biology as Biochem. 705).

An intensive treatment of modern biochemistry; protein structure, enzyme catalyzed reactions, chemistry and metabolism of carbohydrates. Cornwell, Serif, and Interdepartmental Staff.

**707 U G 5****General Biological Chemistry**

W. 3 cl.

Prereq.: 705 or Biochem. 705.

Not open to students with credit for Biochem. 707.

(Cross-listed in Biochemistry and Molecular Biology as Biochem. 707).

An intensive treatment of modern biochemistry; energy utilization and electron transport, photosynthesis, membranes and lipid metabolism. Cornwell, Serif, and Interdepartmental Staff.

**709 U G 5****General Biological Chemistry**

Sp. 3 cl.

Prereq.: 707 or Biochem. 707.

Not open to students with credit for Biochem. 709.

(Cross-listed in Biochemistry and Molecular Biology as Biochem. 709.)

An intensive treatment of modern biochemistry; intermediary metabolism of amino acids, proteins, and nucleic acids. Cornwell, Serif, and Interdepartmental Staff.

**793 P 6, 12, or 18 G 2-15****Individual Studies in Physiological Chemistry**

3 or 4 months; offered all months.

Su, A, W, Sp.

Prereq.: 612 or equiv. and permission of instructor.

Repeatable to a maximum of 15 cr. hrs. for grad credit; must repeat to 18 or 24 cr. hrs. for professional credit.

Qualified students may avail themselves of the facilities of the department for conducting a minor investigation under the direction of a senior staff member.

**821†\* G 3****Physical Biochemistry of Proteins**

A. 3 cl.

Prereq.: 709 or equiv., or permission of instructor.

Protein structure (primary, secondary, tertiary, and quaternary) in the crystal state and in solution and their relationship to function. Alben.

**822†\* G 3****Bioenergetics**

W. 3 cl.

Prereq.: 709 or equiv., or permission of instructor.

Flow of energy in biological systems, photosynthesis, oxidative phosphorylation, methods of studying mitochondria, chloroplasts, and other organelles. Brierley.



**823\* G 3****Metabolic Control Mechanisms**

A. 3 cl.

Prereq.: 709 or equiv., or permission of instructor.

Biochemistry of nucleic acids and the genetic code; protein biosynthesis and its control; control of enzymatic reactions and metabolic pathways. Webb.

**824\* G 3****Enzymology**

Sp. 3 cl.

Prereq.: 709 or equiv., or permission of instructor.

Selected topics in structure/function relationships, mechanisms of catalysis, kinetics, and metabolic inter-relations of enzyme systems. Richardson.

**825\* G 3****Neurochemistry**

W. 3 cl.

Prereq.: 709 or equiv., or permission of instructor.

Biochemistry and metabolism of the nervous system with discussion of synaptic transmission, memory theories, genetic defects, and associated diseases. Horrocks.

**826†\* G 3****Membranes and Membrane Models**

Sp. 3 cl.

Prereq.: 709 or equiv., or permission of instructor.

Discussion of the composition, biosynthesis, structure, function, and turnover of membranes, emphasizing the role which lipids play in maintaining membrane function. Cornwell.

**830 G 3****Physical Methods in Biochemistry**

W. 2 cl., 1 3-hr. lab.

Prereq.: 821, physical chemistry, or permission of instructor.

A practical and theoretical introduction to the use of the analytical ultracentrifuge, Tiselius electrophoresis, spectroscopy, chromatography and radioisotopes. Alben.

**835 G 3****Biochemical Preparations and Techniques**

A. 9 hrs. conf. and lab.

Prereq.: 821; prereq. or concur. 822.

Advanced course in biological preparations and laboratory techniques; isolation of carbohydrates, lipids, proteins, enzymes, and hormones.

**850 G 1****Seminar**

Prereq. or concur.: 611, or equiv.

Repeatable to a maximum of 9 cr. hrs.

Required of all grad. students majoring in physiol. chem.

Cornwell and Staff.

**855 G 2****Seminar in Physiological Chemistry**

Su, A, W, Sp.

Repeatable to a maximum of 8 cr. hrs.

Topic to be announced.

**898 G 1****Interdepartmental Seminar in Nutrition and Food Technology**

Sp.

(See Interdepartmental Seminars, Course Offerings catalog.)

**999 G Arr.****Research in Physiological Chemistry**

Su, A, W, Sp.

Research for thesis or dissertation purposes only.

## Physiological Optics

Office: 111 Optometry Building, 338 West 10th Avenue

**Professors** Hebbard (Chairman), Blackwell, Fry, and Hill; **Associate Professors** Bailey, J. King, Mote, and Smith; **Assistant Professors** Carifa, Fugate, Haines (Emeritus), Ingling, Jones, V. King, Lowther, Saladin, Schoessler, and Zinnecker; **Instructors** Augsburg, Polasky, Reardon, N. Uniacke, and Young.

**511 U P G 5****Introduction to Physiological Optics I**

Sp. 4 cl., 1 2-hr. lab.

Prereq.: Physics 435 and Physiol. Opt. 608.

Not for grad. credit to students majoring in Physiol. Opt.

The eye as an optical instrument; the refracting mechanism; the mechanism of accommodation and pupillary contraction; blur of the retinal image; stray light in the eye.

**512 U P G 5****Introduction to Physiological Optics II**

A. 4 cl., 1 2-hr. lab.

Prereq.: 511.

Not for grad. credit to students majoring in physiol. opt.

The motility of the eye; the structure and innervation of the extraocular muscles; the center of rotation; and analysis and description of eye movements.

**520 U P G 4****Measurement and Specification of Visual Stimuli**

A. 3 cl., 1 2-hr. lab.

Prereq.: Optom. 2nd yr. standing and 511.

Not for grad. credit to students majoring in physiol. opt.

Light sources; diffusely transmitting and reflecting surfaces and scattering of light by a medium; principles of photometry and colorimetry as applied to visual stimuli.

**531 U P 5****Basic Human Anatomy**

A. 3 cl., 2 2-hr. lab.

Prereq.: Optom. 1st yr. standing or major in physiol. opt.

Basic human developmental, neural, and gross anatomy, using models and films, supplemented with animal demonstrations.

**535 U P 5****Microscopic Anatomy**

W. 3 cl., 2 2-hr. lab.

Prereq.: Optom 1st yr. standing or major in physiol. opt.

Microscopic anatomy of cells and tissues, and special histology of the organ systems.

**608 U P G 5****Anatomy of the Eye**

Sp. 3 cl., 2 2-hr. lab.

Prereq.: 1st yr. Optom. or Zool. 530 and permission of instructor.

Human gross anatomy of the head and neck with special emphasis on the eye and orbit; histology and embryology of the eye and associated structures.

**613 U P G 5****Intermediate Physiological Optics I**

W. 4 cl., 1 2-hr. lab.

Prereq.: 512.

Monocular sensory mechanisms of vision; analysis and specification of visual stimuli; photoreception and retinocortical transmission; adaptation of photoreceptors; flicker; brightness discrimination; and color-vision.

**614 U P G 3****Intermediate Physiological Optics II**

W. 3 cl.

Prereq.: 512.

Circulation and metabolism of the eye; intra-ocular pressure; lacrimal system; movements and functions of the eyelids.

**693 U P G 1-15****Individual Studies in Physiological Optics**

Su, A, W, Sp.

Prereq.: Permission of dept. chairman.

Repeatable to a maximum of 15 cr. hrs.

A properly qualified student may perform a minor investigation or add to his knowledge and technique.

**715 U P G 5****Intermediate Physiological Optics III**

Sp. 4 cl., 1 2-hr. lab.

Prereq.: Optom. 2nd yr. standing and 613.

Projection of visual impressions; the horopter, retinal correspondence; binocular integration of hue and brilliance.

**716 U P G 5****Intermediate Physiological Optics IV**

W. 3 cl., 1 2-hr. lab.

Prereq.: 715.

Visual perception of color, illumination, figure-ground relations, size, shape, direction, distance, motion, time, and complex patterns.

**730 U P G 5****Principles of Lighting**

W. 4 cl., 1 2-hr. lab.

Prereq.: 716.

The effect of the distribution of light in a given environment upon efficiency, comfort, and safety; selection and arrangement of sources and light control.

**731 U P G 5****Vision in Industry**

Sp. 5 cl.

Prereq.: 730.

Visual testing in industry; relation of vision to performing a task; visual requirements for licenses; eye hazards and protection; compensation for loss of vision.

**732 U P G 5****Vision in Schools**

A. 3 cl., 6 hr. lab.

Prereq.: 730.

Visual survey methods; the prevalence of visual anomalies and eye diseases in children; basic visual skills required in school and methods for their improvement.

**795 U P G 1-5****Seminar**

Su, A, W, Sp. 1-5 cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 30 cr. hrs.

A series of seminars dealing with new developments in the various phases of physiological optics.

**801 G 5****Advanced Physiological Optics I**

A. 3 cl., 2 2-hr. lab.

Prereq.: 716.

The ocular image-forming mechanism; accommodation and pupil contraction, aberrations, stray light entopic phenomena; shape, size, distortion; retinal illuminance and blur.

**802 G 5****Advanced Physiological Optics II**

W. 3 cl., 2 2-hr. lab.

Prereq.: 801.

Fixation disparity; photochemistry and electrophysiology of photo-receptors; luminosity; color-mixture; retinal-cortical transmission; simultaneous contrast; visibility; adaptation; after images.

**803 G 5****Advanced Physiological Optics III**

Sp. 3 cl., 2 2-hr. lab.

Prereq.: 802.

Binocular integration of hue and brilliance, fusional movements, fixation, retinal correspondence, visual perception of figure-ground relations, light, color, illumination, size, shape, direction, distance, and motion.

**810 G 5****Image Evaluation**

A. 5 cl.

Prereq.: 613, Physics 435, and 436.

An analysis of the causes of image impairment in the human eye and other optical systems; objective methods of assessing aberrations and blur; methods of image enhancement.

**811 G 5****Mechanisms Subserving Color Vision**

W. 5 cl.

Prereq.: 613

Theoretical basis for chromatic adaptation, chromatic contrast and induction, color blindness, and other color phenomena; theory of the laws of color mixture.

**812 G 5**

### Advanced Neurophysiology of the Visual System

A. 4 cl., 1 2-hr. lab.

Prereq.: 613, 614, 715, and 716.

The coding and transmission of visual information in the direct and accessory pathways of vertebrates and invertebrates.

**813 G 5**

### Advanced Physiology of the Eye

A. 4 cl., 1 2-hr. lab.

Prereq.: 613 and 614.

Recent developments in the respiration, metabolism, and mechanics of ocular tissues, and the aqueous dynamics of the eye.

**815 G 5**

### Binocular Vision and Perception

W. 3 cl., 1 2-hr. lab.

Prereq.: 803.

Visual perception: direction, space, motion; perceptual adaptation; binocular vision and fusion.

**820 G 5**

### Specification of Visual Stimuli

Su. 3 cl., 4 hr. lab.

Prereq.: 801 or permission of instructor.

Study of visual stimuli and apparatus to control parameters such as intensity, spectral composition, retinal location, and pupil size and location; calibration and practical application.

**999 G Arr.**

### Research in Physiological Optics

Su, A, W, Sp.

Research for thesis or dissertation purposes only.

## Physiology

Office: 4196 Graves Hall, 333 West 10th Avenue

**Professors** Little (Chairman), Angerer, Bozler (Emeritus), Brownell (Emeritus), Grubbs, Hiatt, LeBrie, Lessler, Myers, Nishikawara, Pieper, Smith, Stow, and Weiss; **Associate Professors** Beman, Billings, Grossie, Hanson, Kunz, Lipetz, Lipsky, Mathews, Michal, and Paul; **Assistant Professors** Allison, Blair, Delahayes, Hendrich, Holt, Noyes, and Yapple.

For related courses see Biology.

**311 U 5**

### Principles of Human Physiology I

A, W. 4 cl., 1 2-hr. lab.

Prereq.: 2 qtrs. Chem., Anat. 200 or equiv.; or permission of instructor.

Open only to students in College of Medicine or College of Pharmacy.

Credit not given for 311 without 312.

First of a two-quarter sequence covering the following areas of physiology: neuromuscular, heart and circulation, endocrine, brain and special senses, body fluids and kidney, respiration, digestion, temperature control, and metabolism.

**312 U 5**

### Principles of Human Physiology II

Sp, W. 4 cl., 1 2-hr. lab.

Prereq.: 311 or permission of instructor.

Continuation of 311.

**600 U G 4**

### Human Physiology for Bio-Medical Engineers

A. 4 cl.

Prereq.: Grad. standing in Bio-Medical Engineering; Open to selected 4th yr. Engr. students by permission of instructor.

An introduction to the function of the major human organ systems and the medical aspects of engineering problems for bio-medical engineers.

**601 U P G 5**

### Advanced Mammalian Physiology I

A. 4 cl., 1 lab.

Prereq.: Inorganic and organic chem., Physics 111, 112, 113 or equiv., and 1 yr. biological sciences, and permission of instructor for undergraduates.

Credit for 601 not given without 602; not for grad. credit to students majoring in physiol.; not open to students with credit for 516 or 517.

First of a two-quarter sequence presenting the following areas of physiology: neuromuscular, heart and circulation, endocrine, brain and special senses, body fluids and kidney, respiration, digestion, temperature control, and metabolism.

**602 U P G 5**

### Advanced Mammalian Physiology II

W. 4 cl., 1 lab.

Prereq.: 601.

Not for grad. credit to students majoring in physiol.; not open to students with credit for 517.

Continuation of 601.

**604 P G 6**

### Advanced Physiology

A. 5 cl., 1 3-hr. lab.

Prereq.: Dent. 2nd yr. standing.

The cardiovascular system including blood, neuromuscular system, body fluids, and excretion.

**605 P G 6**

### Advanced Physiology

W. 5 cl., 1 lab.

Prereq.: Dent. 2nd yr. standing and 604 or equiv.

The central nervous system and special senses, respiration, digestion, metabolism, the endocrines, and reproduction; continuation of 604.

**723 P G 5**

### Cellular and Comparative Physiology

A. 4 cl., 1 lab.

Prereq.: 1 yr. each of biol., physics, and organic chem., and permission of instructor.

Not open to students with credit for 623 or 823.

Interaction between cells and their environment at the microscopic, submicroscopic, and molecular levels; regulation and control of protoplasmic functions. Lessler.

**728 P G 4****Advanced Cellular and General Physiology**

Sp. 4 cl. Arr.

Prereq.: Biol. 101 or equiv., Physics 112 or equiv., 2 qtrs. Chem. 232 or equiv., Chem. 531 or equiv., permission of instructor.

Not open to students with credit for 628 or 828.

Current concepts of ultrastructures and their function in various protoplasmic systems: membrane phenomena; excitatory process; energy utilization in various kinds of cells. Angerer.

**729 P G 2****Advanced Cellular and General Physiology Laboratory**

Sp. 2-3 hr. lab. arr.

Prereq. or concur.: 728.

Not open to students with credit for 628 or 828.

Techniques for the study and measurements of phenomena of cellular and general physiological interest and the application of physical and chemical principles to their interpretation. Angerer.

**730 P G 5****Endocrinology**

Sp. 4 cl., 1 lab.

Prereq.: 311 and 312, organic chem. and permission of instructor.

Not open to students with credit for 630 and 830.

A study of functions of the thyroid, parathyroid, pituitary, adrenal, pancreas, gonads, and other organs with possible endocrine functions. Brownell, Nishikawara, and Staff.

**746†\* P G 5****Radiation Biophysics**

A. 5 cl.

Prereq.: 1 yr. each of college biol., math., physics, and physiol. and Physiol. Chem. 601, 602 or 611, 612 or equiv., and permission of instructor.

Not open to students with credit for 646 or 846.

Stable and radioactive isotopes; biological effects of ionizing radiation. Myers.

**748 U P G 4****Physical Instrumentation for Biologists**

A. 1 cl., 2 3-hr. lab.

Prereq.: 1 yr. college biology and physics or permission of instructor.

Not open to students with credit for 848.

Basic concepts in semiconductor electronics; representative small signal, digital, and integrated circuits, input and output transducers, recording, storage and elementary information processing techniques are studied in the laboratory; emphasis is on representative examples rather than on a comprehensive survey of instruments. Stow.

**793 U P G 2-18****Individual Studies in Physiology**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 24 cr. hrs.

Reading, conferences, laboratory work by individual arrangement with qualified students who desire more intensive and specialized study than is available in other courses.

**801 G 2****Topics in Physiological Research**

A. 2 cl.

Prereq.: Grad 1st yr. standing in physiol. or permission of instructor.

Formal lectures and demonstrations from the graduate faculty of Physiology describing their areas of research interest, explaining the relationship of these areas to the subject matter of physiology and pointing out their pertinence to current frontiers in physiology.

**835 G 5****Advanced Physiology of Organ Systems I**

A. 4 cl., 1 lab.

Prereq.: Inorganic and organic chem., Physics 111, 112, 113 or equiv., 1 yr. of biological sciences, or permission of dept. chairman.

Not open to students with credit for 601-602, or 825-826.

First of a three-quarter sequence presenting an intensive treatment of mammalian organ systems: the cell, the membrane, neuromuscular system, central nervous system, and sense organs.

**836 G 5****Advanced Physiology of Organ Systems II**

W. 4 cl., 1 lab.

Prereq.: 835.

Not open to students with credit for 601-602, or 825-826.

Continuation of 835: blood, cardiovascular system, fluid compartments, kidney, and temperature regulation.

**837 G 5****Advanced Physiology of Organ Systems III**

Sp. 4 cl., 1 lab.

Prereq.: 836.

Not open to students with credit for 601-602, or 825-826.

Continuation of 836; respiration, acid-base balance, digestion, metabolism, endocrines, and reproduction.

**840 G 3****Environmental Physiology I**

A. 3 cl.

Prereq.: M.D. degree or grad. standing and 601 and 602 or equiv., and permission of instructor.

Physiology of the gaseous environment. Billings and Hiatt.

**841 G 3****Environmental Physiology II**

W. 3 cl.

Prereq.: M.D. degree or grad. standing and 601 and 602 or equiv., and permission of instructor.

Physiology of the electromagnetic environment. Billings and Hiatt.

**842 G 3****Environmental Physiology III**

Sp. 3 cl.

Prereq.: M.D. degree or grad. standing and 601 and 602 or equiv., and permission of instructor.

Physiology of the kinetic environment. Billings and Hiatt.

**850 G 2**  
**Seminar in Physiology**

Su, A, W, Sp.  
 Repeatable.

**911 G 3 or 5**  
**Advanced Studies in Physiology**

Su, A, W, Sp.  
 Prereq.: 602 or equiv., 826 or equiv., and 837 or equiv.  
 Quarter schedule of topics to be announced.

**911.01 Physiology of Nerve and Muscle**  
 DeLahayes.

**911.02 Neurophysiology of Spinal Reflexes**  
 Grossie.

**911.03 Hemodynamics**  
 Pieper.

**911.04 Cardiac Dynamics**  
 Little.

**911.05 Peripheral Circulation**  
 Paul.

**911.06 Temperature Regulation**  
 Hiatt.

**911.07 Blood and Erythropoiesis**  
 Lessler.

**911.08 Comparative—Avian**  
 Weiss.

**911.09 Renal Physiology**  
 LeBrie.

**911.10 Respiration Mechanics and Gas Exchange**  
 Lipsky.

**911.11 Physiological Responses to Altered Blood Gas Concentrations**  
 Smith.

**911.12 The Adrenal Hormones**  
 Nishikawara.

**911.13 Endocrine Control of Metabolism**  
 Nishikawara

**911.14 Physiology of Reproduction**  
 Hendrich.

**911.15 Gastrointestinal Physiology**  
 Hanson.

**911.16 Biological Control Systems**  
 Kunz.

**911.17 Advanced Instrumentation**  
 Stow.

**911.18 Sensory Electrophysiology**  
 Lipetz.

**911.19 Limbic Systems Functioning**  
 Michal.

**911.20 General Physiology of Protoplasm**  
 Angerer.

**911.21 Thyroid Physiology**  
 Hendrich.

**999 G Arr.**  
**Research in Physiology**

Su, A, W, Sp.  
 Research for thesis or dissertation purposes only.

## Plant Pathology

Office: 210 Botany and Zoology Building, 1735 Neil Avenue

**Professors** Deep (Chairman), Ellett, Janson, Leben, Partyka, Schmitthenner, Williams (Associate Chairman, Wooster), and Wilson; **Associate Professors** Bradfute, Garraway, Gordon, Herr, Hoitink, Louie, Porter, and Troxel; **Assistant Professors** Farley, Gingery, Jones, Larsen, Miller, Muse, Powell, Riedel, and Weidensaul.

**GENERAL PREREQUISITES FOR COURSES  
 NUMBERED 300 AND 400**

Unless otherwise indicated, the prerequisites for 300 and 400-level courses of 90 cr. hrs. in collegiate courses, exclusive of ROTC and Phys. Ed.; or specified course(s) numbered 100-399.

**401 U 5**  
**General Plant Pathology**

A, Sp. 3 cl., 2 2-hr. lab.

Prereq.: Bot. 102.

Not open to students with credit for 470.

An introduction to diseases of plants. Deep, Larsen, and Troxel.

**GENERAL PREREQUISITES FOR COURSES  
 NUMBERED 600**

Unless otherwise indicated, the prerequisites for 600-level courses are 15 cr. hrs. in courses in the same discipline numbered 300 or higher, or 10 cr. hrs. in courses numbered 300 or higher, in the same discipline, plus 10 cr. hrs. in courses numbered 300 or higher in specified allied disciplines.

**610 U G 3**  
**Diseases of Ornamentals**

W. 1 1-hr. cl., 2 2-hr. lab.

Prereq.: 401.

Not open to students with credit for 471.

A detailed study of important diseases of floral and woody ornamental plants; their cause, distribution, severity, importance, and specific control measure. Ellett.

**615 U G 3**  
**Economic Plant Pathology**

A. 2 2-hr. cl.

Prereq.: 401 or equiv.

Not open to students with credit for 671, 672, or 675.

Major diseases of field, fruit, and vegetable crops with emphasis on etiology, epidemiology, and control. Riedel.

**615.01†\* Fruit and Vegetable Crop Diseases**

**615.02\* Field Crop Diseases**

**685 U G 2**  
**Field Plant Pathology**

Su. 1 4-hr. cl. arr.

Prereq.: 401 or 615, and permission of instructor.

Study of plant diseases in the field with emphasis on diagnosis and epidemiology; supplementary laboratory work. Ellett.

**693 U G 1-5****Individual Studies**

Su, A, W, Sp.

H693 (Honors) may be available to students enrolled in a college Honors Program or eligible for enrollment.

Prereq.: Permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

Problems may be selected in the various areas of plant pathology.

**694 U G 2, 3, or 5****Group Studies**

Su, A, W, Sp.

Prereq.: Senior or grad. standing.

Repeatable to a maximum of 10 cr. hrs.

Special group studies of a selected area in plant pathology not provided in other courses.

**GENERAL PREREQUISITES FOR COURSES  
NUMBERED 800 AND 900**

Unless otherwise indicated, the prerequisites for 800 and 900-level courses are 30 cr. hrs. in courses in the same discipline, or 20 cr. hrs. in the same discipline, plus 25 cr. hrs. in specified allied disciplines.

**821 G 3****Principles: Bacterial, Fungal,  
and Nematode Diseases**

A. 3 cl

Prereq.: 401 or 615, Bot. 660, and Microbiol. 607.

Principles of plant pathology based on an understanding of pathogen structure, growth, and reproduction. Ellett.

**822 G 3****Principles: Epidemiology and Control**

W. 3 cl.

Prereq.: 401 or 615, Bot. 660, and Microbiol. 607.

Influence of environment on plant disease; principles of plant disease control. Larsen.

**823 G 5****Principles: Virology, Physiology of Parasitism**

Sp. 3 cl., 2 2-hr. lab.

Prereq.: 401 or 615, Bot. 631, and 10 cr. hrs. organic chem. or biochem.

Principles of plant virology; physiological interactions between the host plant and pathogen. Garraway.

**828 G 2****Philosophy of Plant Pathology**

W. 2 2-hr. cl.

Prereq.: 821, 822, and 823.

Not open to students with credit for 871.

Philosophy and principles which underlie the study of plant disease with reference to the basic factors governing initiation and development of disease and host-parasite relationships. Allison.

**830 G 5****Physiology of Parasitism**

W. 3 cl., 2 2-hr. lab.

Prereq.: 823, Bot. 634, and Biochem. 511 and 521.

Analysis of physiological and biochemical processes associated with penetration, development of host-parasite relations, and disease development; molecular basis for disease resistance. Garraway.

**832\* G 3****Bacterial Plant Pathogens**

Sp. 2 cl., 1 2-hr. lab.

Prereq.: 401, Microbiol. 607, and 25 additional cr. hrs. biological sciences.

Not open to students with credit for 872.

Representative types of bacterial plant diseases and factors affecting their control, severity, distribution, and economic importance; methods used in studying plant pathogenic bacteria. Larsen.

**834†\* G 3****Plant Virology**

Sp. 2 cl., 1 2-hr. lab.

Prereq.: 821 and 822.

Not open to students with credit for 873.

Biology and chemistry of plant viruses; epidemiology and host-virus-vector interactions; methods used in studying plant viruses. Gordon and Troxel.

**836 G 5****Plant Nematology**

A. 2 cl., 2 2-hr. lab., several field trips.

Prereq.: 821 and 822.

Not open to students with credit for 874.

Bionomics and taxonomy of nematodes which cause plant diseases; host-parasite interactions; methods used in studying plant parasitic nematodes. Riedel.

**Physiology of Fungi**

(See Botany 861.)

(Offered in cooperation with the Department of Botany)

**897 G 1****Interdepartmental Seminar in Natural Sciences**

A, W, Sp.

Repeatable to a maximum of 9 cr. hrs.

(See under Interdepartmental Seminars.)

**898 G 1****Interdepartmental Seminar  
in Nutrition and Food Technology**

Sp.

Repeatable to a maximum of 9 cr. hrs.

(See under Interdepartmental Seminars.)

**995 G 1****Seminar**

A, W, Sp.

Prereq.: Permission of instructor.

Repeatable.

Deep.

**999 G Arr.****Research**

Su, A, W, Sp.

Research for thesis or dissertation purposes only.

## Polish

Office: 204 Dieter Cunz Hall of Languages, 1841 Millikin Road

Associate Professor Krzyzanowski.

### 601†\* U G 4

#### Polish

A. 3 cl., 2 hr. arr.

Prereq.: Russ. 103, or 112, or permission of instructor.

### 602†\* U G 4

#### Polish

W. 3 cl., 2 hr. arr.

Prereq.: 601.

### 603†\* U G 4

#### Polish

Sp. 3 cl., 2 hr. arr.

Prereq.: 602.

### 604\* U G 3

#### Intermediate Polish

A. 3 cl.

Prereq.: 603 or equiv.

### 605\* U G 3

#### Intermediate Polish

W. 3 cl.

Prereq.: 604 or permission of instructor.

Reading texts of moderate difficulty, conversation, and simple compositions.

### 606\* U G 3

#### Intermediate Polish

Sp. 3 cl.

Prereq.: 605 or permission of instructor.

Reading from modern Polish literature, practice in writing and speaking.

### 620\* U G 5

#### Polish Literature in English Translation

A. 3 cl.

Polish literature from the Medieval Period to 1864: the Medieval period, Renaissance, Baroque, Classicism, Romanticism; emphasis on Kochanowski, Mickiewicz, Slowacki, Krasinski, and Norwid. Krzyzanowski.

### 621\* U G 5

#### Polish Literature in English Translation

W. 3 cl.

Modern Polish literature from 1864 to the present; emphasis on Positivism, Realism, and Symbolism; novels of Prus, Sienkiewicz, Zeromski, and Reymont. Krzyzanowski.

### 693 U G 2-10

#### Individual Studies

Su, A, W, Sp.

Prereq.: Permission of dept. chairman.

Each decimal subdivision repeatable to a maximum of 20 cr. hrs.

693.01 Literature to 1820

693.02 Literature 1820-1860

693.03 Literature after 1860

693.04 Morphology

693.05 Phonology

693.06 Dialectology

693.07 Old Polish

693.08 Unspecified

### 694 U G 2-10

#### Group Studies

A, W, Sp.

Prereq.: Permission of chairman.

Repeatable to a maximum of 15 cr. hrs.

### 722\* U G 5

#### Contemporary Polish Literature

Sp. 3 cl.

Prose and poetry since 1945; emphasis on Borowski, Brandys, Slonimski, Andrzejewski, Dabrowska, Hlasko, Iwaszkiewicz, Stawinski, and Rozewicz.

### 821†\* G 5

#### The Structure of Polish

Sp. 3 cl.

Prereq.: 606 or permission of instructor.

Analysis and description of the phonological and morphological systems of contemporary standard Polish.

### 830†\* G 5

#### Mickiewicz and Romanticism

A. 3 cl.

Prereq.: 606 and 621, or permission of instructor.

Critical analysis of the major works of Polish Romantic poetry and drama; emphasis on Mickiewicz's poems, dramas, and criticism.

### 831†\* G 5

#### The Age of Realism

W. 3 cl.

Prereq.: 606 and 621, or permission of instructor.

Fiction of the second half of the 19th century; emphasis on Sienkiewicz and Prus; intellectual and literary development.

### 832†\* G 5

#### Twentieth Century Polish Writers to 1939

Sp. 3 cl.

Prereq.: 606 and 621, or permission of instructor.

Fiction, poetry, and drama, from the Neo-Romantic period to World War II; emphasis on Zeromski, Reymont, and Wyspianski.

### 850\* G 5

#### Seminar in Polish Literature to 1820

A. 2 cl.

Prereq.: 722 or permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

**851\* G 5**  
**Seminar in Polish Literature 1820-1860**  
 W. 2 cl.  
 Prereq.: 722 or permission of instructor.  
 Repeatable to a maximum of 15 cr. hrs.

**852 G 5**  
**Seminar in Polish Literature after 1860**  
 Sp. 2 cl.  
 Prereq.: 722 or permission of instructor.  
 Repeatable to a maximum of 15 cr. hrs.

**993 G 2-10**  
**Individual Studies**  
 Su, A, W, Sp.  
 Prereq.: Permission of chairman.  
 Repeatable to a maximum of 40 cr. hrs. in any combination of decimal subdivisions.

- 993.01 Literature to 1820
- 993.02 Literature 1820-1860
- 993.03 Literature after 1860
- 993.04 Morphology
- 993.05 Phonology
- 993.06 Dialectology
- 993.07 Old Polish
- 993.08 Unspecified

**994 G 2-10**  
**Group Studies**  
 A, W, Sp.  
 Prereq.: Permission of chairman.  
 Repeatable to a maximum of 15 cr. hrs.

## Political Science

Office: 223 Derby Hall, 154 North Oval Drive

**Professors** Ripley (Chairman), Alger, Burgess, Herson, Hofstetter, Kessel, Nemzer, Rosenau, and Sani;  
**Associate Professors** Champlin, Clausen, Hermann, Liddle, Nelson, Phillips, Richardson, and Stewart;  
**Assistant Professors** Adams, Asher, Bedeski, Harf, McCoy, Meckstroth, Milder, Miller, Thorson, Van Horne, and Van Meter; **Instructors** Ban and Waldman.

**165 U 5**  
**Fundamentals of Government**  
 Su, A, W, Sp. 5 cl.  
 H165 (honors) may be available to students enrolled in a College Honors Program or by permission of dept.  
 Not open to students with credit for 201, 202, 203, or 265.  
 A study of political ideas, institutions, processes, and problems, presenting comparatively the leading types of government in the modern world.

**201 U 5**  
**The Individual in Politics**  
 A, W, Sp. 5 cl.  
 H201 (Honors) may be available to students enrolled in a college Honors Program or by permission of dept.  
 Focus on concepts, such as role, attitude, and communication, used for analysis of politics at the individual or group level.

**202 U 5**  
**Political Behavior of Collectivities**  
 A, W, Sp. 5 cl.  
 H202 (Honors) may be available to students enrolled in a college Honors Program or by permission of dept.  
 Focus on concepts, such as system, process, structure, and social accounting, used for the analysis of more complex entities such as a national or international system.

**203 U 5**  
**Political Analysis**  
 A, W, Sp. 5 cl.  
 H203 (Honors) may be available to students enrolled in a college Honors Program or by permission of dept.  
 Introduction to problems of construction and analysis of empirical and ethical theories of politics.

**294 U 5**  
**Group Studies**  
 A, W, Sp. 5 cl.  
 Repeatable to a maximum of 10 cr. hrs.

**300 U 5**  
**Introduction to American Politics**  
 Su, A, W, Sp. 5 cl.  
 Not open to students with credit for 100.  
 An examination of American political institutions and processes with emphasis on the national government.

**325 U 5**  
**Introduction to Comparative Politics**  
 A, W, Sp. 5 cl.  
 An introduction to basic theories, approaches, and methods of analysis in comparative politics; substantive discussion of selected topics.

**345 U 5**  
**Introduction to International Systems**  
 Su, A, W, Sp. 5 cl.  
 Not open to students with credit for 545.  
 Political relations among states; methods and goals of diplomacy; current problems in major areas of tension; tendencies toward administrative, judicial, and legislative world organization.

**365 U 5**  
**Introduction to Political Theory**  
 Su, A. 5 cl.  
 Not open to students with credit for 565.  
 An introduction to the major works and problems of political theory, with emphasis on the nature of political theory.



**501 U G 5****The American Presidency**

A. 5 cl.

Not open to students with credit for 601.

An examination of the American presidency emphasizing the contemporary role of the president, the institutionalized presidency, and theories of presidential behavior.

**502† U G 5****Campaign Politics**

A. 5 cl.

The organization and strategy of American political campaigns; practical politics seen in the light of knowledge about political behavior and public opinion.

**504 U 5****Black Politics**

A. 5 cl.

Not open to students with credit for 208 or Black Studies 504.

(Cross-listed in the Black Studies Division.)

Economic, political, and social constraints on the development of black political power; the efforts made by black people in recent times to organize for effective political action.

**505 U G 5****Urban Government**

A, W. 5 cl.

Introduction to the governance of urban communities in the United States.

**506† U G 5****Ohio Politics**

Sp. 5 cl.

Examination of state politics with special reference to Ohio.

**516 U G 5****Judicial Politics**

Sp. 5 cl.

Analysis of the roles of judges and lawyers as participants in the American political process; analysis of courts as political institutions.

**541 U G 5****Government and Politics of the New States**

W. 5 cl.

A general introduction to the theoretical and substantive literature dealing with the historical development and contemporary characteristics of the new states of Asia and Africa.

**542 U G 5****Topics in Cross-National Analysis**

Sp. 5 cl.

Repeatable to a maximum of 10 cr. hrs.

Topics in cross-national analysis such as elites, public opinion, political parties will be addressed.

**560† U G 5****Regional Patterns in International Politics**

A. 5 cl.

Repeatable to a maximum of 15 cr. hrs.

Examination of ideological, institutional, and foreign political patterns in particularized regions, such as Sub-Sahara Africa, Arab Middle East, Southeast Asia.

**562 U G 5****Regional Patterns in International Politics: Latin America**

W. 5 cl.

Basic power concepts, political institutions, and international relations of Latin America.

**570 U G 5****Political Theories of Change and Models of the Future**

W. 5 cl.

An examination of models of the role of the scientist in dealing with the future or futurology.

**571† U G 5****Political Theories of Democracy**

A. 5 cl.

A critical examination of political theories of democracy, with attention to both descriptive and evaluative aspects, in context of purportedly democratic politics.

**573† U G 5****American Political Ideas**

W. 5 cl.

An analysis of American ideas on law and government, authority and liberty, oligarchy and democracy.

**578† U G 5****Political Decision-Making**

A. 3 cl., 1 lab.

Not open to students with credit for 378.

Explores application of economic, bureaucratic, and organizational behavior models of political decision-making; includes topics on social forecasting and simulation, program budgeting, and social indicators.

**585 U 5****Techniques of Political Analysis**

W. 5 cl.

Introduction to research design, nature of data, its generation and machine analysis; analysis of political variables.

**593 U G 1-15****Individual Studies**

A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Students will devote their time to special projects including papers, exams, and practical political experience.

**594 U 5****Contemporary Political Problems**

A, W, Sp. 5 cl.

Repeatable to a maximum of 30 cr. hrs.

GENERAL PREREQUISITES FOR COURSES  
NUMBERED 600 AND 700

Unless otherwise indicated the prerequisites for 600 and 700-level courses are two courses in political science, or a declared major in another social science, or the consent of the instructor, or the history and social science requirements of the B.A. curriculum.

**602 U G 5****Public Opinion and Political Behavior:  
Psychological Foundations**

A. 5 cl.

Not open to students with credit for 676.

The formation, organization, and change of attitudes about American politics; methods of survey design and analysis including computer adaptations.

**603 U G 5****Public Opinion and Political Behavior:  
Sociological Foundations**

W. 5 cl.

Prereq.: 602.

Not open to students with credit for 678.

Influences of political culture, social class, primary and secondary groups, the media, minority status, and social change on public opinion are covered.

**604 U G 5****American State Politics**

A. 5 cl.

Not open to students with credit for 605.

Comparative analysis of politics in the American states.

**608 U G 5****Ethnic Politics in the American Cities**

W. 5 cl.

Group conflict along ethnic lines in major American cities: factors contributing to group cohesion in politics; strategies and resources for exercising power through collective political action.

**610 U G 5****Executive and Bureaucratic Politics**

Sp. 5 cl.

Introduction to the roles and behavior of executives and bureaucrats in the formulation and implementation of public policy in the United States.

**614 U G 5****Urban Politics**

W. 5 cl.

The study of political problems facing the cities: including community power, poverty, welfare, urban renewal, urban education, law enforcement, and violence.

**617 U G 5****Legislative Politics and Policy-Making**

A, W. 5 cl.

Not open to students with credit for 677.

Studies of legislative organization, practices, and recruitment, and their relation to the policy outputs; relationships of the legislature to other elements of the American political system.

**626 U G 5****British Government and Politics**

W. 5 cl.

An analysis of the nature of politics and the conduct of government in contemporary Britain, including the making of foreign policy.

**627 U G 5****Government of Western Europe**

A. 5 cl.

An examination of the political institutions and processes of France, West Germany, and the European integration movement.

**630 U G 5****The Soviet Union**

A, Sp. 5 cl.

A general study of the Soviet Union; governmental and party institutions; ideology and methods; problems of communist dictatorship.

**631† U G 5****Survey of the Social Sciences in the USSR**

W. 3 cl.

Prereq.: 4th yr. standing or grad. standing or enrollment in Certificate Program for Translators.

An introduction to bibliography and methodology of the social sciences in the USSR.

**635 U G 5****Government and Politics of Japan**

Sp. 5 cl.

The government and politics of Japan, with special emphasis being given to the impact of cultural and social patterns on the processes of government with imported political institutions.

**636 U G 5****Southeast Asia**

A. 5 cl.

Governments and politics of the Philippines, Indonesia, Indo-China, Malaya, Thailand, and Burma; contemporary problems of this region in relation to world politics.

**637 U G 5****The Government and Politics of China**

A. 5 cl.

Prereq.: 225 or 525 recommended.

A study of the contemporary political process of Communist China; considerable time will be spent on an analysis of recent political change in China and the process of revolution.

**640 U G 5****Latin American Government and Politics**

A. 5 cl.

Not open to students with credit for 540.

A study of political processes, institutions, and groups in Latin America, with emphasis on constitutional, geographical, social, and economic environment in which they operate.

**650† U G 5****International Law**

Sp. 5 cl.

A study of the principles of international law.

**651 U G 5****International Organization and Administration**

A. 5 cl.

An examination of the current system of international organization and its administrative aspects, with emphasis on the operations of the United Nations agencies.

**655 U G 5****Soviet Foreign Policy**

W. 5 cl.

Basic concepts about, and choices in, Soviet foreign policy; development and present patterns of Soviet relations with key nations; major problems in future relationships.

**656 U G 5****The United States in World Affairs**

W, Sp. 5 cl.

Domestic factors and agencies influencing American foreign policy; basic patterns of recent American relations, especially with the Soviet bloc, Western Europe, and the Middle East.

**658† U G 5****International Relations of the Far East**

Sp. 5 cl.

The Far East in contemporary world politics; factors underlying the foreign policies of the nations concerned with this region.

**665† U G 5****Contemporary Political Theorizing I: Empirical**

A. 5 cl.

Introduction to problems of forming and justifying "explanatory" theories; topics include "science", "truth", "explanation", "observation", and "value" in context of contemporary theories of political action.

**666 U G 5****Contemporary Political Theorizing II: Analytic**

W. 5 cl.

An introduction to formal analytic approaches to theorizing about ethical, descriptive, and predictive dimensions of political life.

**667 U G 5****Contemporary Political Theorizing III: Conceptual**

A. 5 cl.

Introduction to the analysis of language, concepts, and vocabulary used in political theorizing; attention on relations among concepts, statements, explanation, and justification.

**670 U G 5****History of Political Theory I: Ancient and Medieval**

A. 5 cl.

The study of major works by political theorists, including Plato, Aristotle, Cicero, Augustine, Aquinas, and others, in ancient and medieval times.

**671 U G 5****History of Political Theory II: Machiavelli to Rousseau**

W. 5 cl.

The study of major works by political theorists, including Machiavelli, Hobbes, Locke, Hume, Montesquieu, Rousseau, and others, from the Renaissance into the 18th century.

**672 U G 5****History of Political Theory III: Bentham to the Present**

Sp. 5 cl.

The study of major works by political theorists, including Bentham, Kant, Hegel, Marx, Mill, Weber, and others, since the French Revolution.

**674 U G 5****Political Participation and Voting Behavior**

A. 5 cl.

A study of political participation and its correlates, determinants of the vote decision analysis of recent American elections.

**675 U G 5****American Political Parties**

A, W. 5 cl.

Not open to students with credit for 575.

Theories of political parties, party organization, individual voting behavior, nomination and electoral politics, the party in government.

**679 U G 5****Policy Analysis**

W. 5 cl.

Not open to students with credit for 620.

An analysis of the policy process emphasizing the determinants of public policy, theories of public choice, and the implementation, impact, and evaluation of policy decisions.

**685 U G 5****Methods of Quantitative Analysis: Elementary**

W. 5 cl.

Explication, interpretation, and application of techniques for quantitative analysis of political data; descriptive and inferential statistics, with emphasis on bivariate analysis.

**686 U G 5****Methods of Quantitative Analysis: Intermediate**

Sp. 5 cl.

Prereq.: 685.

Descriptive and inferential statistics with emphasis on multivariate analysis; additional topics offered as desired and possible: scaling, index construction, sampling, measurement reliability.

**693 U G 1-5****Individual Studies**

Su, A, W, Sp.

Prereq.: 4th yr. standing and 40 cr. hrs. in social sciences, including 15 cr. hrs. in Pol. Sc.

Repeatable to a maximum of 20 cr. hrs.

A special topic is assigned to each student and results are tested by papers and special examinations.

**700 U G 5****Basic Theories  
in the Study of American Politics**

A. 2 2-hr. cl.

Repeatable to a maximum of 10 cr. hrs.

Examination of basic concepts and approaches; consideration of methodological and substantive problems encountered at various levels of analysis.

**Introduction to National Security**

(See Nat. Sec. Pol. S. 702.)

**703† U G 5****Readings in Individual Political Behavior**

A. 2 2-hr. cl.

Prereq.: 602 or 603 or equiv.

Repeatable to a maximum of 10 cr. hrs.

Intensive analysis of literature on selected topics such as socialization, cognition, groups, and attitudes.

**704† U G 5****Readings in State and Local Politics**

A. 2 2-hr. cl.

Prereq.: 604 or 614 or equiv.

Intensive review of selected aspects of the literature on state and local politics in the United States.

**713 U G 5****Readings in Executive and Bureaucratic Politics**

Su. 2 2-hr. cl.

Prereq.: 610 or equiv.

Intensive examination of literature with emphasis on the role of executives and bureaucrats in the formulation and implementation of public policy.

**717† U G 5****Readings in Legislative Politics  
and Policy-Making**

W. 2 2-hr. cl.

Prereq.: 617 or equiv.

A theoretical-empirical analysis of the functioning and policy product of American legislatures; intensive reviews of selected aspects of the legislative literature to be conducted.

**725 U G 5****Basic Theories in the Study of Comparative  
Government**

A, Sp. 3 cl.

Repeatable to a maximum of 15 cr. hrs.

Examination of such concepts and theories as structural-functional analysis; general systems theory; and sociocultural systems as determinants of governmental structures.

**727 U G 5****Problems in Western European Politics**

W. 1 2-hr. cl.

Prereq.: 626 or 627 or permission of instructor.

Intensive study of selected problems.

**731 U G 5****Problems in Soviet Politics**

W. 3 cl.

Prereq.: 630 or 655.

An intensive examination of selected problems such as crises of succession, conflicts of pressure groups, Soviet policies in the United States, Sino-Soviet relations.

**734 U G 5****Problems in Asian Politics**

W. 1 2-hr. cl.

Prereq.: 635 or permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

An advanced seminar for the purpose of structured reading of advanced scholarly materials and limited research experimentation in East and Southeast Asian topics.

**740† U G 5****Problems in Latin American Politics**

Sp. 1 3-hr. cl.

Prereq.: 562 or 640 or permission of instructor.

An advanced seminar devoted to a structured examination of the major theories, concepts, and approaches used in the analyses of Latin American politics.

**741 U G 5****Political Development**

Sp. 3 cl.

Prereq.: 541 or 636 or 640 or permission of instructor.

Theories, approaches, and methodology in the analysis of political life in the new states of Asia and Africa; discussion of selected case and cross-national studies with theoretical relevance.

**745 U G 5****Basic Theories in the Study of International  
Relations**

A, W. 3 cl.

Repeatable to a maximum of 15 cr. hrs.

Examination of such basic concepts and theories as equilibrium models, balance of power, national interest, geopolitical configurations.

**749 U G 5****Topics in Cross-National Policy Analysis**

W. 3 cl.

Prereq.: 745.

A comparative examination of substantive cross-national policy issues such as welfare, security, economic development, etc.

**757\* U G 5****Comparative Foreign Policies**

W. 5 cl.

Prereq.: 655 or 656 or permission of instructor.

Examines comparatively the sources and classes of behavior of territorial actors in the international political system.

**758 U G 5****Regional Integration**

W. 3 cl.

Prereq.: 650 or 651 or permission of instructor.

Political trends in and consequences of regional organization.

**759 U G 5****International Systems**

A. 2 2-hr. cl.

Prereq.: 745.

Examines the influence of (1) the power distribution among nations; (2) alliance configurations within the international system; and (3) events external to nations upon inter-nation behavior.

**765 U G 5****Basic Theories in the Study of Politics**

Sp. 3 cl.

Examination of the diverse works and strategies that purport to be political theory, with emphasis on the unity of theory as an intellectual enterprise.

**766 U G 5****Selected Topics in Political Theory**

W. 1 2-hr. cl.

Prereq.: Grad. standing or permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Intensive joint readings and discussions concentrating upon one of the major themes, problems, or movements in political theory; topic information available from instructor.

**767 U G 5****Explanation and Evaluation**

Sp. 2 2-hr. cl.

Prereq.: 790 or equiv.

Critical inquiry into the role of political theories in explanation and evaluation of political life.

**768 U G 5****Political Theory and Conceptual Analysis**

A. 2 2-hr. cl.

Prereq.: 790 or equiv.

Critical examination of the contribution of conceptual analysis to the understanding of existing theories and the creation of new ones.

**774 U G 5****Readings in Political Participation and Voting Behavior**

W. 2 2-hr. cl.

Prereq.: 674 or equiv.

Intensive examination of literature on selected topics in the area of participation and voting behavior in the United States.

**775 U G 5****Readings in American Political Parties**

Sp. 3 cl.

Intensive study of literature or selected aspects of American political parties.

**776 U G 5****Comparative Political Institutions**

W. 3 cl.

Study of comparative political institutions (executives, legislatures, bureaucracies, constitutions) utilizing a broad cross-national perspective.

**777 U G 5****Comparative Political Behavior**

A. 3 cl.

A cross-national examination of political behavior, including such topics as socialization, participation, voting, elite behavior, mass-elite linkages.

**778 U G 5****Comparative Political Parties and Interest Groups**

A. 3 cl.

Comparative analysis of the nature and role of political parties and interest groups in contemporary societies.

**779 U G 5****Readings on the Policy Process**

Sp. 2 2-hr. cl.

Consideration of the basic theories, concepts, and techniques used in policy analysis; the determinants of public policy; and the impact and evaluation of public policy.

**H783 U 3-5****Honors Course**

Su, A, W, Sp.

Prereq.: 4th yr. standing and 40 cr. hrs. in social sciences, including 15 cr. hrs. in Pol. Sc., with a record of A in at least half of the Pol. Sc. courses and an average of B in the remainder. Permission of instructor under whose supervision the work is to be completed and the Arts and Sciences Honors Committee. At least two qtrs. are required of candidates for the degree of Bachelor of Arts with distinction in Pol. Sc. Failure to receive a mark of S in this course is a disqualification for special honors.

Repeatable to a maximum of 15 cr. hrs.

A special topic is assigned to each student and results are tested by the requirement of papers and special examinations.

**Research Principles and Techniques in National Security**

(See Nat. Sec. Pol. S. 785.)

**786 U G 5****Causal Analysis**

Sp. 2 2-hr. cl.

Prereq.: 685 and 686.

Analysis of casual models by Simon-Blalock techniques, recursive and nonrecursive path estimation; special topics include measurement error, standardization, and ordinal data.

**787† U G 5****Dimensional Analysis**

Sp. 2 2-hr. cl.

Prereq.: 685 and 686.

Topics include measurement and data theory, unfolding, proximity and dominance (Guttman) scaling, multidimensional scaling, and factor analysis.

**788 U G 5****Mathematical Theories of Politics**

A. 2 2-hr. cl.

Prereq.: 790 or equiv.

Introduction to various major mathematical theories of political phenomena and the role of formal analysis in political science.

**790 U G 5****Scope and Methods of Political Science**

A. 1 2-hr. cl., 1 1-hr. cl.

Prereq.: 4th yr. standing and 15 cr. hrs. in pol. sc.

The materials of political science; history of procedure in political science research; research technique, presentation of results of research.

**791 U G 5****Problems in Research Design and Execution**

W. 4 cl., 1 1-hr. lab.

Prereq.: Grad. standing or permission of instructor.

Examines the **Methodological** problems of research designs for the acquisition and analysis of data with special attention to the methods of cross-national research.

**794 U G 3-5****Contemporary Political Problems**

W, Sp. 2 3-hr. cl.

Prereq.: Senior standing and 15 cr. hrs. in Pol. Sc.

Repeatable to a maximum of 30 cr. hrs.

**GENERAL PREREQUISITES FOR COURSES  
NUMBERED 800 AND 900**

A general foundation in undergraduate courses in history and the social sciences is assumed. Any of the 800-level courses listed may be repeated provided that no student shall earn more than 10 hours of credit in any single course.

**Seminar in National Security Research**

(See Nat. Sec. Pol. S. 801.)

**803 G 5****Research in Public Opinion**

Sp. 1 2-hr. cl.

Prereq.: 602 and 603 or permission of instructor.

Development and execution of a research design focusing on a problem in American public opinion; consultation on substantive and methodological problems offered by instructor.

**804 G 5****Research on State and Local Politics**

A. 1 2-hr. cl.

Development and execution of a research design on a selected topic in American state or local politics; consultation on substantive and methodological problems offered by instructor.

**813 G 5****Research on Executive and Bureaucratic Politics**

W. 1 2-hr. cl.

Development and execution of a research design focusing on a problem in American executive and bureaucratic politics; consultation with instructor on substantive and methodological problems.

**817 G 5****Research in Legislative Politics and Policy-Making**

Sp. 1 2-hr. cl.

Prereq.: 717 or equiv.

Development and execution of a research design focusing on a particular problem in American legislative research; consultation on substantive and methodological problems offered by instructor.

**826 G 3-5****Comparative Government**

W, Sp. 1 2-hr. cl.

Prereq.: 2 pol. sc. courses in foreign governments at 600 level or above, or equiv.

Repeatable to a maximum of 15 cr. hrs.

Seminar in the governments of foreign countries.

**846 G 3-5****International Relations**

A, W, Sp. 1 2-hr. cl.

Prereq.: 651 or 656 or 545 or equiv.

Repeatable to a maximum of 15 cr. hrs.

Seminar in international relations.

**866 G 5****Topics in Political Theory**

W. 1 2-hr. cl.

Repeatable to a maximum of 10 cr. hrs.

Intensive treatment of selected topics and texts in political theory and theory construction.

**874 G 5****Research in Political Participation and Voting Behavior**

Sp. 1 2-hr. cl.

Prereq.: 774 or equiv.

Development and execution of a research design focusing on a problem in electoral research; extensive consultation with instructor on substantive and methodological aspects of problem.

**875† G 5****Research on American Political Parties**

Su, Sp. 1 2-hr. cl.

Development and execution of a research design focusing on a problem relating to American political parties; consultation on substantive and methodological problems offered by instructor.

**879† G 5****Research on Policy-Making**

A. 1 2-hr. cl.

Research into the process of policy-making and the substance of public policy; consultation on substantive and methodological problems offered by instructor.

**899 G 1-5****Interdepartmental Seminar**

Su, A, W, Sp.

(See under Interdepartmental Seminars.)

**999 G Arr.****Research in Political Science**

Su, A, W, Sp.

Research for thesis or dissertation purposes only.

# Portuguese

Office: 248 Dieter Cunz Hall of Languages, 1841 Millikin Road

**Professor Griffin (Chairman); Assistant Professor Tolman.**

## 101 U 5

### Elementary Portuguese

A. 5 cl.

Elements of Portuguese grammar, with oral and written exercises; attention to ear training and oral practice; and customs.

## 102 U 5

### Elementary Portuguese

W. 5 cl.

Prereq.: 101.

The elements of Portuguese grammar with abundant oral and written exercises; development of conversational skill; reading, vocabulary building.

## 103 U 5

### Intermediate Portuguese

Sp. 5 cl.

Prereq.: 102 or 110.

Continuation of Portuguese grammar; reading of short stories, plays, and novels; increased attention to development of oral proficiency.

## 104 U 5

### Intermediate Portuguese

A. 5 cl.

Prereq.: 103 or 112.

Reading of Portuguese plays, short stories, and novels; emphasis on oral practice; non-fiction of cultural and historical significance.

## 110 U 5, 10

### Intensive Elementary Portuguese

A, W, Sp. 10 cl.

Prereq.: Permission of dept.

Not open to students with credit for 102. Students with credit for 101 or equiv. may not register for more than 5 cr. hrs.

Elementary Portuguese for students wishing to acquire the basic skills in one quarter; intensive drill in form, syntax, vocabulary, and idiom; equivalent to 101 and 102.

## 112 U 5, 10, 15

### Intensive Portuguese

Su. 15 cl. Enrollment limited to 20 students.

Full time of student and full fees required.

Prereq.: Permission of chairman.

Equiv. of 101, 102, and 103. Students with credit for 101 or the equiv. may not register for more than 10 hrs. Students with credit for 101 and 102 or the equiv. may not register for more than 5 cr. hrs. Students with credit for 103 or the equiv. may not register for credit.

Elementary and intermediate Portuguese; intensive drill in forms, syntax, vocabulary, and idiom; reading of short stories and plays in Portuguese.

## 193 U 1-15

### Individual Studies

Su, A, W, Sp.

Prereq.: Permission of dept.

Repeatable to a maximum of 30 cr. hrs.

## 194 U 1-15

### Group Studies

Su, A, W, Sp.

Prereq.: Permission of dept.

Repeatable to a maximum of 30 cr. hrs.

## 202† U 5

### Portuguese Conversation and Composition

W. 5 cl.

Prereq.: 104 or permission of instructor.

Intensive practice in conversation and composition based on materials concerning current life in Brazil and Portugal, with thorough review of grammar.

## 401† U 3

### Review Grammar and Composition

Sp. 3 cl.

Prereq.: 104.

Review of Portuguese grammar; compositions based on readings.

## 404†\* U 5

### Portuguese Pronunciation

W. 5 cl.

Prereq.: 104.

Practice with corrective exercises to continue development of aural-oral skills.

## 421 U 5

### Introduction to Modern Luso-Brazilian Literature

A. 5 cl.

Prereq.: 104.

Reading and discussion of important modern Portuguese and Brazilian literary works.

## 422† U 5

### Modern Prose Fiction

W.

Prereq.: 421 or permission of instructor.

Representative readings of modern Portuguese and Brazilian novels and short stories.

## 423† U 5

### Modern Poetry and Drama

Sp.

Prereq.: 421 or permission of instructor.

Representative readings from modern Luso-Brazilian poetry and drama; lectures, discussions, and reports.

## 620†\* U G 5

### Main Currents in the Development of Portuguese Literature

A. 5 cl.

Prereq.: 421, and 422 or 423, or permission of instructor.

Portuguese literature from the Middle Ages to the present with emphasis on the evolution of major movements.

**621†\*** U G 5**Main Currents in the Development of Brazilian Literature**

A. 5 cl.

Prereq.: 421, and 422 or 423, or permission of instructor.  
 Brazilian literature, including the Portuguese colonial literature, from the 16th century to the present.

**622†\*** U G 5**Luis de Camoes**

W. 5 cl.

Prereq.: 421, or 422 and 423, or permission of instructor.  
 An intensive study of Os Lusíadas.

**623†\*** U G 5**The Modern Brazilian Novel**

W. 5 cl.

Prereq.: 421, and 422 or 423, or permission of instructor.  
 The Brazilian novel from the 1930's to the 1960's.

**693** U G 1-15**Individual Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.  
 Repeatable to a maximum of 30 cr. hrs.

**694** U G 1-15**Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.  
 Repeatable to a maximum of 30 cr. hrs.

**993** G 1-5**Individual Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.  
 Repeatable to a maximum of 15 cr. hrs.

**994** G 1-15**Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.  
 Repeatable to a maximum of 30 cr. hrs.  
 Investigation of minor problems in the various fields of Portuguese literature and language.

## Poultry Science

Office: 108 Poultry Administration Building, 674 West Lane Avenue.

**Professors** Naber (Chairman), Baker, Bohl, Brown, Clayton, Harvey, Jaap, Marsh, and Touchburn (Associate Chairman, Wooster); **Associate Professors** Allred, Nestor, and Stephens; **Assistant Professors** Bacon, Chipley, Latshaw, and Saif.

**Domestic Animals in the Service of Man**

(See Animal Sc. 100)

(Offered in cooperation with the Depts. of Dairy Sc. and Poul. Sc.)

**GENERAL PREREQUISITES FOR COURSES NUMBERED 200.**

Unless otherwise indicated, the prerequisites for 200-level courses are 45 cr. hrs. in collegiate courses, exclusive of ROTC and Phys. Ed.; or specified courses numbered 100-199.

**200** U 5**Fundamentals of Poultry Science**

A, Sp. 4 cl., 1 2-hr. lab.

Prereq.: Biol. 100 or Animal Sc. 100.

Application of science and technology in the poultry and related industries. Marsh.

**GENERAL PREREQUISITES FOR COURSES NUMBERED 300 AND 400**

Unless otherwise indicated, the prerequisites for 300 and 400-level courses are 90 cr. hrs. in collegiate courses, exclusive of ROTC and Phys. Ed.; or specified courses numbered 100-399.

**420** U 5**Principles of Animal Improvement**

A, W, Sp. 5 cl.

Prereq.: Animal Science 100, Math. 150 or equiv., and Genetics 140 or 314.

Not open to students with credit for Animal Sc. 420 or Dairy Sc. 420.

(Cross-listed in the Depts. of Animal Sc. and Dairy Sc.)

An introduction to the methods available for bringing about genetic change in farm animals. Fechheimer, Jaap, and Swiger.

**430** U 5**Principles of Animal Nutrition**

Su (1st term), A, W, Sp. 4 cl., 1 2-hr. lab.

Prereq.: Chem. 102 or 122, and Math. 150 or equiv.

Not open to students with credit for Animal Sc. 430 or Dairy Sc. 430.

(Cross-listed in the Depts. of Animal Sc. and Dairy Sc.)

A study of the fundamental principles of nutrition in mammals and birds. Cline, Latshaw, Mahan, and Tyznik.

**GENERAL PREREQUISITES FOR COURSES NUMBERED 500**

Unless otherwise indicated, the prerequisites for 500-level courses are 15 cr. hrs. in courses in the same discipline numbered 200 or higher, or 10 cr. hrs. in courses numbered 200 or higher in the same discipline, plus 10 cr. hrs. in courses numbered 200 or higher in specified allied disciplines; or baccalaureate degree.

**Poultry Marketing**

(See Agr. Ec. 521.)

(Offered in cooperation with the Dept. of Ag. Econ.)

**589** U 5**Poultry Science Experience**

Su, A, W, Sp.

Prereq.: Junior standing or higher and permission of instructor.

Practical experience, including completion of outlined program and written report, in an approved poultry establishment.



**593 U 2, 3 or 5****Individual Studies**

Su, A, W, Sp.

H593 (Honors) may be available to students enrolled in a college Honors Program or eligible for enrollment. Prereq.: 15 cr. hrs. 200-level courses or higher in Poul. Sc., Animal Sc., or Dairy Sc. and permission of instructor.

**594 U G 2, 3, or 5****Group Studies**

Su, A, W, Sp. 2 2-hr. cl.

Repeatable to a maximum of 10 cr. hrs.

Intensive study of selected areas of poultry science appropriate to the group and not provided in other courses.

**GENERAL PREREQUISITES FOR COURSES  
NUMBERED 600**

Unless otherwise indicated, the prerequisites for 600-level courses are 15 cr. hrs. in courses in the same discipline numbered 300 or higher, or 10 cr. hrs. in courses numbered 300 or higher in the same discipline, plus 10 cr. hrs. in courses numbered 300 or higher in specified allied disciplines.

**610\* U G 5****Avian Growth and Meat Production**

Sp. 5 cl.

Prereq.: 200 and 430 or Zool. 220.

Not open to students with credit for 310.

Physiology of growth and development in avian species; environmental factors influencing growth. Jaap.

**611†\* U G 5****Avian Reproduction and Egg Production**

Sp. 5 cl.

Prereq.: 200 and 430 or Zool. 220.

Not open to students with credit for 311.

Physiology of avian reproduction and egg production as affected by circadian rhythms, social stress, neuroendocrine mechanisms, ambient environment and immunological competence. Jaap.

**Physiology of Reproduction and Growth**

(See Dairy Sc. 612.)

(Offered in cooperation with the Depts. of Animal Sc. and Dairy Sc.)

**Laboratory in Reproductive Physiology  
and Artificial Insemination**

(See Dairy Sc. 613.)

(Offered in cooperation with the Depts. of Animal Sc. and Dairy Sc.)

**630 U G 5****Nutrition and Feeding of Monogastric Animals**

A, W, Sp. 4 cl., 1 2-hr. lab.

Prereq.: 430 or equiv.

Not open to students with credit for Animal Sc. 630.

(Cross-listed in the Dept. of Animal Sc.)

The nutrition of swine, poultry, and laboratory animals; principles and practice. Cline, Latshaw, Mahan, and Naber.

**640 U G 5****Prevention and Control of Avian Diseases**

W. 3 cl., 2 2-hr. lab.

Prereq.: Chem. 102 or 122 and Microbiol. 509 or 607.

The etiology, recognition, prevention, and control of the important diseases of poultry and related birds. Marsh.

**650 U G 5****Egg and Poultry Products Technology**

A. 4 lec., 1 2-hr. lab.

Prereq.: Chem. 102 or 122 and Microbiol. 509 or 607.

Quality identification and maintenance; processing; physical, chemical, microbiological and nutrient properties; preservation and utilization of egg and poultry products. Chipley.

**695 U G 1-2****Seminar**

A, W, Sp.

Naber.

**GENERAL PREREQUISITES FOR COURSES  
NUMBERED 700**

Unless otherwise indicated, the prerequisites for 700-level courses are 15 cr. hrs. in courses in the same discipline numbered 400 or higher, plus additional specified courses numbered 600 or higher.

**Advanced Reproductive Physiology**

(See Dairy Sc. 710.)

(Offered in cooperation with the Depts. of Animal Sc. and Dairy Sc.)

**720 U G 5****Genetics of Animal Populations**

W. 5 cl.

Prereq.: 420 or Genetics 630, and 10 cr. hrs. in math.

Not open to students with credit for Animal Sc. 720 or Dairy Sc. 720.

(Cross-listed in the Depts. of Animal Sc. and Dairy Sc.)

Theory and practice of analyzing and altering the genetic composition of animal populations. Swiger.

**GENERAL PREREQUISITES FOR COURSES  
NUMBERED 800 AND 900**

Unless otherwise indicated, the prerequisites for 800 and 900-level courses are 30 cr. hrs. in courses in the same discipline, or 20 cr. hrs. in the same discipline, plus 25 cr. hrs. in specified allied disciplines.

**810 G 3****Advances in Physiology of Domestic Animals**

A, W, Sp. 4-hr. cl.

Prereq.: Acceptable courses in physiol., anat., biochem., and permission of instructor.

Not open to students with credit for Animal Sc. 810 or Dairy Sc. 810.

(Cross-listed in the Depts. of Animal Sc. and Dairy Sc.)

**810.01\* Adrenal Function**

A.

Brown and Gomes.

**810.02\* Endocrinology of Reproduction**

W.

Gomes.

**810.03\* Immunology and Immunogenetics**

Sp.

Hines.

**810.04†\* Thyroid and Parathyroid Function**

A.  
Hibbs.

**810.05†\* Mammalian Germ Cells**

W.  
VanDemark.

**810.06†\* Biometerology and Animal Performance**

Sp.  
Ludwick.

**820 G 3****Current Topics in Animal Genetics**

3 cl.

Prereq.: Acceptable courses in animal genetics, mathematics, and statistics.

Repeatable to a maximum of 12 cr. hrs.

Not open to students with credit for Animal Sc. 820 or Dairy Sc. 820.

(Cross-listed in the Depts. of Animal Sc. and Dairy Sc.)

**820.01 Selection Index Theory**

Sp.  
Allaire and Harvey.

**820.02\* Nonadditive Genetic Variance**

W.  
Harvey and Swiger.

**820.03\* Polymorphic Systems**

W.  
Fechheimer.

**820.04†\* Simulation of Genetic Systems**

W.  
Harvey.

**820.05†\* Cytogenetics of Animal Populations**

W.  
Fechheimer.

**820.06†\* Physiological Indices in Animal Breeding**

A.  
Jaap.

**830 G 3****Advanced Studies in Nutrition**

Su, A, W, Sp. 3 or 4 cl.

Prereq.: Permission of instructor.

Not open to students with credit for Animal Sc. 830 or Dairy Sc. 830.

(Cross-listed in the Depts. of Animal Sc. and Dairy Sc.)

**830.01\* Energy**

A.  
Conrad.

**830.02\* Minerals**

W.  
Cline.

**830.03\* Proteins and Amino Acids**

Sp.  
Naber and Vivian.

**830.04†\* Vitamins**

A.  
Naber and Tyznik.

**830.05†\* Lipids**

W.  
Palmquist.

**830.06†\* Laboratory Methods in Nutrition**

Sp.  
Allred, Mahan, and Vivian.

**898 G 1****Interdepartmental Seminar in Nutrition and Food Technology**

Sp.  
(See under Interdepartmental Seminars.)

**993 G 2, 3, or 5****Individual Studies**

Su, A, W, Sp.  
Prereq.: 15 cr. hrs. of 300-level courses or higher in poul. sc., animal sc., or dairy sc. and permission of instructor.

**999 G Arr.****Research**

Su, A, W, Sp.  
Research for thesis or dissertation purposes only.

## Preventive Medicine

Office: B-107 Starling-Loving Hall, 320 West 10th Avenue

**Professors** Ellingson (Chairman), Ambuel, Ayres, Billings, Fancher (Emeritus), Keller, Lewis (Emeritus), Palchanis (Emeritus), Petersen, Rustagi, Shaffer, Shillito (Emeritus), and Tomashefski; **Associate Professors** Anderson, Bashe, Berry, Lanese, Rettig, von Gierke, Webb, and Wick; **Assistant Professors** Ackerman, Banks, Bason, Bunner, Briggs, Campbell, Chirikos, Clausen, Davis, Ertel, Garner, Heggen, Hull, Lentz, Masters, McLemore, Milliken, Morley, Nick, Scobie, Shadle, Sharp, Spears, Stinson, Taylor, Thomas, Turner, Washam, Weir, and Westra; **Instructors** Beyer, Brandes, Brown, Burrier, Chase, Coulter, Dierker, Dillahunt, Downey, Ervin, Foster, Gahman, Giraldo, Good, Hall, Hambrick, Hamdi, Heffelfinger, Heilman, Herwig, Holbrook, Hoyt, Hughes, Lausa, Lowery, Maggied, Marsicano, Mauler, McLarnan, Mezger, Millay, Myers, C. Paul, W. Paul, Pultz, Rudy, Saathoff, Samlowski, Slivinski, Smith, Jr., Sorgen, Weddington, Weir, Weltner, White, Williams, Wynsen, Yantes, and Young.

**485 U 4****Medical Factors in the Work Environment**

A, W. 3 1-hr. cl., 1 2-hr. lab.  
Study of human responses and adaptation to work under different environmental stresses in the industrial setting. Bason.

**585 U 3****Epidemiology**

A. 2 cl.  
Prereq.: Microbiol. 210 or 509.  
The principles of epidemiology in relation to human health and disease. Keller.

**623 U P 2****Critical Reading of Scientific Literature**

Sp. 1 2-hr. cl.  
Prereq.: Permission of instructor.

Description of the basic principles of experimental design and statistics necessary for critical reading of the scientific literature which is used as illustrative material. Billings and Bason.

**685 P 6, 12, 18 G 6-12**

### **Field Experience in Comprehensive Health Planning**

Su, A, W, Sp. Field time assigned for medical students 1, 2, or 3 months and grad. students 1/2 or entire Summer Quarter.

Prereq.: Permission of instructor.

Full time assignment to a state or local health planning agency, to work on a specific project in community health under the guidance of a selected faculty adviser. Campbell.

**730 P G 3**

### **Principles of Environmental Health I**

A. 2 2-hr. cl.

Prereq.: Permission of instructor.

Basic aspects of man as a consumer of environmental resources and producer of pollutants; man's responses to stresses in his physical environment; his ranges of tolerance for environmental extremes. Billings.

**731 P G 3**

### **Principles of Environmental Health II**

W. 2 2-hr. cl.

Prereq.: 730 or permission of instructor.

Man's responses to environmental contaminants in air, water and food; his tolerance limits for toxic substances and pollutants. Billings.

**732 P G 3**

### **Principles of Environmental Health III**

Sp. 2 2-hr. cl.

Prereq.: 730 and 731, or permission of instructor.

Man's responses to his biological environment; his tolerance limits for microbiological stress; modes of adaptation and mal-adaptation; alteration of man's ecosystem; the consequences of such alterations. Billings.

**740 P G 3**

### **Population and Health I**

A. 2 cl. and 1 conf.

Prereq.: Permission of instructor.

Introduces students in preventive medicine to the concepts, data, and analytical tools of demography as they relate to health problems and planning. Petersen.

**741 P G 3**

### **Population and Health II**

W. 2 cl. and 1 conf.

Prereq.: 740 and permission of instructor.

Continuation of 740; applications of demography to health-care programs. Petersen.

**742 U P G 3**

### **Culture and Health**

Sp. 2 1½-hr. cl.

Prereq.: Permission of instructor.

A cross-cultural analysis of the effects on health and mortality of such factors as diet, addictions, family structure, race or ethnicity, beliefs and superstitions. Petersen.

**753 P 6**

### **Principles of Public Health Administration**

1 month, offered all months except June.

Prereq.: Permission of instructor.

Administration, organization, and function of public health agencies; principles of sanitation, food inspection, immunization, and school health.

Keller and Bashe.

**763\* P G 1**

### **Medicolegal Problems in Industry**

A. 1 1-hr. cl.

Prereq.: Grad. standing in Prev. Med., or permission of instructor.

Legal relationships among employers, physicians, and employees; liability in case of injury; evaluation of disability; workmen's compensation; malpractice. Nick.

**764 P G 3**

### **Design of Biomedical Investigations**

A. 2 2-hr. cl.

Prereq.: Permission of instructor.

Design of studies in biomedical area; formulation of hypotheses; sampling; planning observations and measurements; selection of statistical techniques; testing of hypotheses. Heggen.

**770 P G 3**

### **Health Survey Methods**

W. 1 2-hr. cl. and 1 1-hr. conf.

Prereq.: Grad. or professional standing and permission of instructor.

An introduction to health survey methods; lectures, readings, classroom and community exercises; consideration of health planning and epidemiological applications. Lanese, Keller, and Petersen.

**771 P G 3**

### **Health Data: Sources and Uses**

Sp. 3 1-hr. cl.

Prereq.: 770, or permission of instructor.

Examination of past and current health data accumulations, discussion of their uses and shortcomings, and experience in the acquisition and analysis of health-related information Keller, Lanese, and Petersen.

**780 P G 2**

### **Current Health Problems: Maternal and Child Health**

W. 1 2-hr. cl.

Prereq.: Grad. or professional standing and permission of instructor.

The epidemiology of major causes of death and disability among mothers and children; community programs for prevention, detection, and treatment; current status of control. Bashe.

**781 P G 2**

### **Current Health Problems: Adult Health**

Sp. 1 2-hr. cl.

Prereq.: Grad. or professional standing and permission of instructor.

The epidemiology of major causes of death and disability among adults; community programs for prevention, detection, and treatment; current status of control on local, state, national, and international levels. Keller.

**785 P G 3****Biostatistics and Computers in Medical Research**

W. 1 2-hr. cl. and 1 2-hr. lab.

Prereq.: Permission of instructor.

Review of the fundamental concepts of biostatistics, including more complex analysis of variance designs, integrated with application of the electronic computer. Heggen, Keller, and Chase.

**786 P G 3****Biometrics Laboratory**

A, W, Sp. 2 1-hr. lab. and 2 1-hr. conf.

Prereq.: 764 or 785.

Repeatable to a maximum of 6 cr. hrs.

Participation in consultations offered to biomedical researchers, combined with individualized faculty guidance. Keller, Lanese, Heggen, and Chase.

**787 P G 3****Health Data Processing**

Sp. 2 1½-hr. cl.

Prereq.: 764 or equiv. and permission of instructor.

Forms design and techniques for the acquisition and manipulation of biomedical data sets, including some fundamentals of electronic data processing. Heggen and Chase.

**793 P 6, 12, 18 G 2-5****Individual Studies in Preventive Medicine**

1, 2, 3, or 4 months; offered all months except June.

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 24 cr. hrs. for professional credit and 15 cr. hrs. for grad. credit.

**793.01 Aerospace Medicine**

Wick.

**793.02 Biometrics**

Lanese.

**793.03 Clinical Environmental Medicine**

Billings.

**793.04 Environmental Health**

Weir.

**793.05 Epidemiology**

Keller.

**793.06 Nutrition**

Anderson.

**793.07 Occupational Medicine**

Billings.

**793.08 Community Health**

Keller.

**793.09 Comprehensive Health Planning**

Chirikos.

**793.10 Health Agency Administration**

Banks.

**793.11 Behavioral Science Studies in Health**

Lanese.

**794 P 6, 12, 18 G 2-5****Group Studies in Preventive Medicine**

1, 2, 3, or 4 months; offered all months except June.

Su, A, W, Sp.

Prereq.: Permission of instructor.

**794.01 Biometrics**

Lanese and Keller.

**794.02 Environmental Health**

Ellingson.

**794.03 Epidemiology**

Keller, Lanese, and Banks.

**794.04 Community Health**

Banks, Chirikos, and Campbell.

**810 G 2****Principles of Aerospace Medicine**

A. 1 2-hr. cl.

Prereq.: Permission of instructor.

History and background of aerospace medicine; government regulatory agencies (FAA and NTSB); civilian and military aerospace medical administration, research and practices; field trips to aerospace facilities. Wick.

**811 G 2****Principles of Occupational Medicine**

W. 1 2-hr. cl., field trips arr.

Prereq.: Permission of instructor.

Intramural and extramural relationships of the physician in industry; physical facilities, personnel, and equipment of industrial medical departments; departmental budgeting; employee examinations, health maintenance programs; safety programs. Billings.

**812 G 3****Public Health Organization**

Sp. 1 2-hr. cl. and 1 1-hr. conf.

Prereq.: Permission of instructor.

History and development of public health agencies; legal bases of public health law; administrative structure of official and voluntary agencies and their relationships to the complex of health and medical services in the community. Keller and Campbell.

**820 G 3****Environmental Toxicology I**

A. 3 1-hr. cl.

Prereq.: Permission of instructor.

Effect of the environmental toxins upon the organism; evaluation of testing methods; study of intermediary metabolism and detoxification; and introduction to chemically induced teratology and carcinogenesis. Weir.

**821 G 3****Environmental Toxicology II**

W. 3 1-hr. cl.

Prereq.: 820 or equiv., or permission of instructor.

Evaluation of the effects of environmental pollution on the organism; including noxious gases, vapors, and particulates. Weir.

**822 G 3****Environmental Toxicology III**

Sp. 3 1-hr. cl.

Prereq.: 821 or equiv., or permission of instructor.

Continuation of 821 covering the effects of metals and their compounds, pesticides, plastics, and plasticizers, and the problem involved with cosmetics, food additives, and residues. Weir.

**823 G 3**  
**Principles of Hyperbaric Medicine**

Sp. 1 3-hr. cl.  
Prereq.: Permission of instructor.  
Basic considerations of the etiology, diagnosis, prevention, and treatment of hyperbaric illnesses including caisson disease, air embolism, nitrogen narcosis, and oxygen poisoning.

**840 G 3**  
**Clinical Aerospace and Occupational Medicine I**

Su. 2 1½-hr. cl.  
Prereq.: Permission of instructor.  
Medical qualification for employment or for flying, from viewpoints of major clinical specialties; general aerospace and industrial medical problems; aerospace and ground safety programs. Wick and Staff.

**841 G 3**  
**Clinical Aerospace and Occupational Medicine II**

Su. 2 1½-hr. cl.  
Prereq.: 840 or permission of instructor.  
Continuation of 840. Wick and Staff.

**845 G 3**  
**Medical Aspects of Human Engineering**

Sp. 2 1½-hr. cl.  
Prereq.: 820, Physiol. 840, or permission of instructor.  
Consideration of interfaces between medicine, physiology, psychology, and engineering in the design of complex systems operated by man; organization and administration of human factors groups. Wick and Staff.

**849 G 2-3**  
**Pro-Seminar in Community Health Development**

A, W, Sp. 1 2-hr. session per wk., and additional conferences.  
Prereq.: Grad. standing in Prev. Med. or permission of instructor.  
Repeatable to a maximum of 12 cr. hrs.  
Each week a basic area of community health development is presented by a specialist; the students prepare by reading assigned literature in this area, respond to questions raised during each session, and prepare reviews of the key issues. Staff.

**850 G 1-3**  
**Seminar in Preventive Medicine**

Su, A, W, Sp.  
Prereq.: Permission of instructor.  
Repeatable to a maximum of 8 cr. hrs.

**850.01 Selected Topics in Occupational or Aerospace Medicine G 1-3**  
Ellingson and Staff.

**850.03 Selected Topics in Community Health G 2-3**  
Keller and Staff.

**851 G 3**  
**Epidemiologic Methods**

A. 2 2-hr. cl.  
Prereq.: Permission of instructor.  
Principles of epidemiology with special emphasis on methods employed in current epidemiologic studies of chronic diseases. Bashe and Keller.

**852 G 3**  
**Comprehensive Health Planning**

W. 1 2-hr. session plus 1 1-hr. conference per wk.  
Prereq.: Grad. standing in Prev. Med. or permission of instructor.  
Study of comprehensive health planning concepts and techniques; with emphasis on topics relating to the design of health plans at the community level. Chirikos.

**853 G 3**  
**Behavioral Epidemiology**

A. 2 1½-hr. cl.  
Prereq.: Permission of instructor.  
A review of the epidemiological literature that examines the relationship between behavioral factors, theories of stress, and disease processes. Lanese and Banks.

**854 G 3**  
**Economics of Community Health**

A. 1 2-hr. cl. and 1 1-hr. cl.  
Prereq.: Econ. 402 or permission of instructor.  
Survey of the application of economic analysis to community health problems; emphasis on topics relating to the allocation of health resources and health manpower. Chirikos.

**855 G 3**  
**Community Health Development**

A. 2 1½-hr. conf.  
Prereq.: Permission of instructor.  
A study of the nature of community development, its operational principles, and successful techniques, as they may be applied to the health field. Keller and Campbell.

**857 G 3-5**  
**Health Planning Laboratory**

Sp. 2 2½-hr. conf.  
Prereq.: 852 or permission of instructor.  
Repeatable to a maximum of 10 cr. hrs.  
Practicum in the application of planning techniques to current health problems and policy issues. Chirikos and Staff.

**860 G 3**  
**Epidemiology and Public Health**

W. 2 2-hr. conf.  
Prereq.: 851 or equiv., or permission of instructor.  
Principles of public health, vital statistics, epidemiology, environmental sanitation, and communicable disease control on local, national, and global bases. Keller and Staff.

**861 G 3**  
**Industrial Hygiene**

Su. 2 1½-hr. conf.  
Prereq.: Permission of instructor.  
Engineering appraisal of environmental health hazards, sampling techniques, instrumentation, and analytical methods; the industrial hygiene survey. Weir and Staff.

**708 P G 1****Psychopathology I**

A. 1 cl.

Prereq.: Permission of chairman.

A sequence course in Autumn, Winter, and Spring Quarters reviewing the clinical, etiological, and psychodynamic aspects of the common psychiatric disorders.

**862 G 3****Environmental Control**

Su. Conf. and field exercises.

Prereq.: Permission of instructor.

Principles of substitution, enclosure, isolation of hazardous operations; local exhaust ventilations; general ventilation-air conditioning; noise control, radiant energy; ionizing radiation; personal protective equipment; medical supervision of persons exposed to conditions of special hazards. Weir and Staff.

**880 G 3****Analysis of Health Care Organizations**

W. 2 1½-hr. cl.

Prereq.: Permission of instructor.

Acquaint student with concepts and techniques of analysis of the structures and actions of health organizations. Keller and Campbell.

**885 G 3****Behavioral Responses in Disease Prevention**

Sp. 1 2-hr. cl. and 1 1-hr conf.

Prereq.: Permission of instructor.

A survey of behavioral science literature concerning health behavior, illness behavior, and sick-role and their impact upon programs for prevention, early detection, and amelioration of disease. Banks.

**899 G 1-5****Interdepartmental Seminar in Industrial Engineering**

W.

Prereq.: Permission of instructor.

The Departments of Industrial Engineering and Preventive Medicine conduct a seminar annually with industrial psychologists in an area of common interest; topic to be announced.

**999 G Arr.****Research in Preventive Medicine**

Su, A, W, Sp.

Research for thesis purposes only.

**Psychiatry**

Office: 071 Upham Hall, 473 West 12th Avenue

**Professors** Gregory (Chairman), Coddington, Corson, Goldman, Green, G. Harding, Jr., G. Harding, Sr. (Emeritus), Kaelbling, W. Knopp, Liss, Marks, Michael, (Emeritus), Palmer (Emeritus), H. Pariser, Pine, and Siegel; **Associate Professors** Brandes, Corlis, Fox, Gardner, Gwynne, Haas, Kangas, Learmonth, Lohrman, McGough, Missildine, Monroe, Morgenstern, Ristine (Emeritus), Stevenson, Todd, Vecozols, Weaver, and Whieldon; **Assistant Professors** Altman, Arnold, Borelli, D. Brown, Burk, Burnes, Carlton, Csetri, Gool, Gove, A. Hall, C. Hall, C. Harding, H. Harding, Hubbard, Hundziak, Johnston, King, E. Knopp, Koch, Leaverton, Lee, Leuchter, Lindner, Litvak, D. Martin, G. Martin, Pinta, Podobnikar, Pugliese, Rowe, Schmidt, Sicking, Smeltzer, Smith, Smith-e-incas, Stinson, Strayer, Stroo, Wells, Welty, and Worst; **Instructors** Belfiori, Blocher, Chrisman, Christopher, Collins, Desgranges, Dixon, Duncan, Feo, Hothem, Huestis, Hutzler, H. Johnson, Jones, Kasper, Kirby, Lalonde, Lenz, Lowenbergh, Luidens, Marx, May, McIntyre, Mezzich, Miller, Mitsak, Oppenheimer, Peterson, M. Pugliese, Randolph, Resor, Rice, Shalvoy, Sherrow, Simmons, and Simpson.

**709 P G 1****Psychopathology II**

W. 1 cl.

Prereq.: 708 or equiv.

Continuation of 708.

**710 P G 1****Psychopathology III**

Sp. 1 cl.

Prereq.: 708 and 709, or equiv.

Continuation of 709.

**711 P G 1****Introduction to Group Psychotherapy**

Sp. 1 cl.

Prereq.: Permission of instructor.

Rationale for the use of group psychotherapy and fundamental techniques needed in starting and conducting a psychotherapeutic group.

**712\* P G 2****Advanced Psychotherapy and Family Therapy I**

A. 1 2-hr. cl.

Prereq.: 740 and 741 or equiv.

Family therapy, communication systems, family rules and structure; analysis of therapist-patient relationships.

**713\* P G 2****Advanced Psychotherapy and Family Therapy II**

W. 1 2-hr. cl.

Prereq.: 712 or equiv.

Continuation of 712.

**714 P G 1****Behavioral Science I**

Sp. 1 cl.

Prereq.: Permission of chairman.

Intensive coverage of scientific research procedures in the behavioral sciences, including the nature of the hypothesis, experimental designs, techniques of controls, and some basic parametric and nonparametric statistics.

**715\* P G 1****Behavioral Science II**

Su, A, W, Sp. 1 cl.

Prereq.: 714.

Continuation of 714.

**717†\* P G 2****Neuropathological Basis of Mental Disorders**

Sp. 2 cl.

Prereq.: Permission of chairman.

Emphasis on new trends in neuropathology as illustrated by results of recent research; considered as a reevaluation of established and hypothetical etiological mechanism of diseases affecting the nervous system.

**718 P G 1****Psychiatric Theory I**

A. 1 cl.

Prereq.: Permission of chairman.

Psychiatric theories of personality, nature and etiology of psychopathology and psychotherapy, plus relevant historical material; emphasizes Freudian psychoanalytic theory and its precursors.

**719 P G 1****Psychiatric Theory II**

W. 1 cl.

Prereq.: 718 or equiv. and permission of chairman.

Continuation of 718.

**720 P G 1****Psychiatric Theory III**

Sp. 1 cl.

Prereq.: 719 or equiv. and permission of chairman.

Psychiatric theories of personality, nature and etiology of psychopathology and psychotherapy, plus relevant historical material; emphasizes other major theorists neither classical, psychoanalytic, nor Neo-Freudian.

**721†\* P G 1****Neuroendocrine Bases of Behavior**

A. 1 cl.

Prereq.: Permission of chairman.

Normal and pathologic operation of selected biologic control systems examined in terms of cybernetics, relating anatomy, physiology, and pharmacology to overt behavior.

**722\* P G 1****Forensic Psychiatry**

Sp. 1 cl.

Prereq.: M.D. degree and permission of chairman.

Psychiatric testimony in criminal and civil legal procedures; determination of competency and indications for involuntary commitment; legal responsibilities of the psychiatrist.

**723\* P G 2****Community Psychiatry**

Su. 2 cl.

Prereq.: Permission of chairman.

A review of the recent growth, development, and expanding programs in the field of community psychiatry.

**724 P G 1-2****Psychiatric Applications of Psychological Tests**

Su. 1 cl.; or Su (2nd term). 2 cl., 2 lab. hrs. optional.

Prereq.: Permission of instructor.

Psychological testing procedures and their use in clinical psychiatry (intelligence testing, personality evaluation, and neuropsychological assessment).

**740 P G 1****Basic Psychotherapy I**

A. 1 cl.

Prereq.: Permission of chairman.

Basic concepts of psychotherapy, theory, and technique, with review of the development and structure of the personality.

**741 P G 1****Basic Psychotherapy II**

W. 1 cl.

Prereq.: 740 or equiv.

Continuation of 740; a study of basic concepts of psychotherapy, theory, and technique, with review of the development and structure of the personality.

**742 P G 2****Child Psychiatry**

Su. 1 2-hr. cl.

Prereq.: Permission of instructor.

Diagnosis and therapy in child psychiatry; etiologic forces that contribute to the development of mental illness in children and their families.

**745†\* P G 1****History of Psychiatry I**

A. 1 cl.

Prereq.: Permission of chairman.

The development of psychiatric concepts and practices through the ages; study of biographical sources and significant writings.

**746†\* P G 1****History of Psychiatry II**

W. 1 cl.

Prereq.: 745 or equiv. and permission of chairman.

Continuation of 745.

**750\* P G 1-2****Psychiatric Aspects of Mental Retardation**

Su. 1 cl., (2 lab. hrs. optional).

Prereq.: Permission of chairman.

Theoretical and clinical aspects of mental retardation as related to psychiatry.

**751†\* P G 1****Anatomical Substrates of Behavior**

A. 1 cl.

Prereq.: Adequate knowledge of neuroanatomy and permission of instructor.

A review of topography and discussions of the nervous system as a substrate of higher nervous functions and seat of mental disturbances.

760

P G 1-3

**Clinical Hypnosis and Hypnotherapy**

Sp. 1 cl., 4-hr. lab. optional.

Prereq.: 710 or equiv. and permission of instructor.

Theoretical and clinical aspects of hypnosis, with experience in techniques and applications in psychotherapy. Gwynne.

793

**Individual Studies in Psychiatry**

1, 2, or 3 months; P 6, 12, 18

Offered all months.

Su, A, W, Sp. G 1-18

Prereq.: Adequate clinical training in psychiatry and permission of chairman and instructor.

Repeatable to maximum of 18 cr. hrs.

A supervised, scholarly investigation of some aspects of psychiatry in which there is interest by the student and expertise by the faculty.

801

G 2-3

**Scientific Basis of Clinical Psychiatry**

Su (2nd term). 6 cl. (4 lab. hrs. optional).

Prereq.: M.D. and permission of instructor.

Principles of case study, interviewing, history-taking, and diagnosis; rationale, indications, contra-indications, and precautions for physiological and psychological treatment. G. Harding, Jr.

850

G 1-6

**Seminars in Psychiatry**

Su, A, W, Sp. 1 cl.

Prereq.: Permission of chairman and instructor.

Repeatable to a maximum of 12 cr. hrs.

- a. Clinical Psychiatry
- b. Group Therapy
- c. Psychotherapy
- d. Psychiatric Literature
- e. Child Psychiatry

980

G 5

**Advanced Clinical Training in Psychology**

Su, A, W, Sp. Full time (40 hrs. plus)

Prereq.: Two yrs. graduate study in clinical psychology and approval of staff.

Repeatable to maximum of 30 cr. hrs.

Provides supervised basic, theoretical, and applied experience in the practice of clinical psychology.

999

G Arr.

**Psychiatry Research**

Su, A, W, Sp.

Prereq.: M.D. and residency in Psychiatry.

Research for thesis purposes only.

## Psychology

Office: 321 Arps Hall, 1945 North High Street

**Professors** Wallace (Chairman), Angelino, Briggs, Brock, Clark, Cook, Erickson, Fletcher, Greenwald, Horrocks, Huelsman, Johnson, Kaswan, Kilpatrick, Latane, Leland, Marks, D. Meyer, Osipow, Ostrom, Pepinsky, Rie, Schmidt, Siegel, Stewart, Stogdill, Thompson, Wenar, Wherry, and Wickens; **Adjunct Professor** P. Meyer; **Associate Professors** Brittin, Campbell, Damarin, Ernst, Fox, Gardner, A. Gross (Visiting), Hakel, Helper, Hothersall, Isaac, Jones, Kangas, Mirels, Monroe, Nolan, Owen, Shulman, and Walsh; **Assistant Professors** Bruce, Dell, Edmonson, Engin, Field, Gilson, Gloss, Greth, S. Gross (Visiting), Handley, Jackson, Kaul, Klimonski, Marsh, Sandman, Schwebel, Shaw, Spitzner, Staats, Timms, Tzeng, Winer, Wise, and Wood; **Adjunct Assistant Professors** Archibald, Watson, and Weaver; **Instructors** Compton, Moyer, and Scott.

100

U 5

**General Psychology**

Su, A, W, Sp. 5 cl.

Introductory psychology, a prerequisite to advanced courses; the application of the scientific method to behavior; topics include learning, motivation, perception, personality, physiological basis of behavior.

101

U 5

**General Psychology**

Su, A, W, Sp. 5 cl.

Prereq.: 100.

Continuation of 100 with further emphasis on the development of a scientific attitude toward personal psychological problems in the fields of learning, thinking, intelligence, and personality.

120

U 3

**Psychology of Personal Effectiveness**

Su, A, W, Sp. 2 cl., 1 2-hr. lab.

A survey of theories and practices designed to improve higher level skills in reading, perception, learning, and adjustments.

130

U 1-4

**Advising College Students**

Sp.

Prereq.: Third qtr. freshman or above and permission of instructor.

Repeatable to a maximum of 4 cr. hrs.

Selected students will study the dynamics of and have experiences in advising students concerning their scholastic, social, and personal development.

210

U 5

**Educational Psychology for Medical Personnel**

Sp. 5 cl.

Prereq.: 100.

Not open to students with credit for 230.

Consideration of human capacities, abilities, interests, individual differences, and overall development; aspects of learning, personality, and physiological correlates of psychological phenomena of interest to medical personnel.



**220 U 3****Quantitative and Statistical Methods in Psychology I**

Su, A, W, Sp. 3 cl.

Prereq.: 100 or 300; and Math. 116 and 117, or equiv.

Elementary presentation of probability, descriptive, and inferential statistics and methods of measurements relevant to contemporary psychology.

**221 U 3****Quantitative and Statistical Methods in Psychology II**

A, W, Sp. 2 cl., 1 2-hr. lab.

Prereq.: 220.

Not open to students with less than a grade of C in 220.

A concentrated examination of the applications of statistical tools in inference and theory construction in contemporary psychology.

**230 U 5****Introduction to Educational Psychology**

Su, A, W, Sp. 5 cl.

Prereq.: 100.

Not open to freshmen or to students with credit for 210.

Facts and principles of human development and learning are applied to the problems of education; scientific evidence in the solution of educational problems is stressed. Angelino and Staff.

**294† U 1-6****Group Studies**

A, W, Sp.

Prereq.: 100 and 101.

Not open to freshmen.

Repeatable to a maximum of 6 cr. hrs.

Reading and/or research projects by special agreement between instructor and students; topics to be announced.

**300 U 5****Introductory Psychology**

A, W. 5 cl.

Prereq.: 220.

Not open to students with credit for 100.

An introduction to psychology for students with science background; topics covered similar to 100.

**310 U 3****Basic Psychology: Perception**

Su, A, Sp. 3 cl.

Prereq.: 220.

Theory, methods, and physiological correlates of sensory and perceptual processes; emphasis on the relation of behavior to stimulus variation. Isaac and Owen.

**311 U 3****General Psychology: Motivation and Action**

A, W. 3 cl.

Prereq. or concur.: 220.

A behavioristic presentation of experimental work on learning and motivation. Spitzner.

**312 U 4****General Psychology: Learning and Thinking**

W, Sp. 3 cl.

Prereq.: 220.

An introduction to the experimental study of human memory, verbal learning, and cognition.

**320 U 3****Social Psychology**

Su, A, W, Sp. 3 cl.

Prereq.: 5 cr. hrs. in psych.

The influence of group processes, organizational variables, and culture upon the social modification of basic drives, attitudes, and language. Brock, Greenwald, Latane, and Ostrom.

**321 U 3****Applications of Psychology**

A, Sp. 3 cl.

Prereq.: 101.

Not open to students with credit for 102.

Drawing on general psychology, evaluation of individual and group performance in relation to social problems is emphasized; examples are drawn from industry, education, and government. Hakel and Wallace.

**330† U 3****Psychology of Abnormal Behavior**

Su. 3 cl.

Prereq.: 5 cr. hrs. in psych.

A consideration of the symptomologies, etiologies and therapies of the major neuroses and psychoses with special emphasis on psychoanalytic theories and methods.

**331 U 3****Psychopathology and Psychotherapy I**

A, Sp.

Prereq.: 5 cr. hrs. in psych.

Examination and comparisons of current theories of the nature of psychological disturbances and their treatment; emphasis on recent conceptualizations and treatment approaches. Weaver.

**332 U 3****Psychopathology and Psychotherapy II**

W.

Prereq.: 10 cr. hrs. in psych.

Continuation of 331.

**333 U 3****Human Behavior Problems**

Su, A.

Prereq.: 5 cr. hrs. in psych.

Analyses of behavior patterns which are often considered undesirable or otherwise problematic; emphasis on behavioral definitions and analyses of problems, and on behavioral interventions. Nolan.

**340 U 3****Genetic Psychology**

A, W. 3 cl.

Prereq.: 9 cr. hrs. in psych.

A survey of developmental psychology including some phylogenetic perspective.

**500 U 3****Experimental Psychology**

A, W, Sp. 2 cl., 2 lab. hrs. arr.

Prereq.: 310 and 312 or permission of instructor.

Open only to Psych. majors.

The experiments are selected both for general and cultural values and for preparation for technical research in experimental psychology. Spitzner.

**501 U G 3****Physiological Psychology**

W. 3 cl.

Prereq.: 101 or 300.

Some physiological correlates of psychological phenomena; the properties of integrated organ systems, with emphasis upon the characteristics of their elements; consideration of psychosomatic abnormalities.

**502 U G 3****Advanced Physiological Psychology**

Sp. 3 cl.

Prereq.: 501.

Further physiological correlates of psychological phenomena; sensory and motor processes will be special topics.

**504 U G 3****Psychology of Music**

W. 3 cl.

Prereq.: Permission of instructor.

Psychological factors in musical learning, memorization, rhythm, harmony, form, tone color, interpretation, dictation, and music talent. Poland.

**505 U G 3****Contemporary Viewpoints in Psychology**

W. 3 cl.

Prereq.: 16 cr. hrs. in psych.

A consideration of the development of modern scientific psychology from its roots in the school of the 19th century to its contemporary status. Hothersall.

**506† U 3****Advanced Experimental Psychology**

Sp. 2 cl., 2 lab. hrs.

Prereq.: 500.

A continuation of 500 in which the student conducts additional experiments including an experiment of his own design.

**511 U G 3****Psychological Testing**

Su, A, W. 2 cl., 1 lab. hr.

Prereq.: 10 cr. hrs. in psych.

An overview of theoretical and practical aspects of the assessment and prediction of human behavior; topics include achievement, intelligence, personality, attitudes, interests, and interpersonal relations. Damarin.

**520 U 4****Experimental Social Psychology**

A, Sp. 2 cl., 4 lab. hrs.

Prereq.: 221, 320, and permission of instructor.

Open only to Psych. majors.

Repeatable to a maximum of 12 cr. hrs.

Typical experiments in such social psychological areas as attitude change, group processes, and group influences upon the individual. Ostrom.

**521 U G 3****Personnel and Organizational Psychology**

A, Sp. 3 cl.

Prereq.: 220 or permission of instructor.

Influence of individual and organizational factors on performance of complex tasks; effects of task involvement on the individual; relationships between organizations and their clients. Klimoski.

**522 U 3****Laboratory in Personnel and Organizational Psychology**

A, Sp. 1 cl., 4 lab. hrs.

Prereq. or concur.: 521 and permission of instructor.

Open only to Psych. majors.

Measurement of individual abilities and traits, group parameters, characteristics of tasks, and individual and group performance.

**530 U G 3****Psychology of Personality**

Su, A, W, Sp. 3 cl.

Prereq.: 10 cr. hrs. in Psych.

Consideration of major theoretical orientation in the study of personality; emphasis on empirical investigation of selected personality dimensions.

**531 U 3 or 5****Clinical Psychology**

Su, A, W, Sp. 3 cl., 2 optional lab.

Prereq.: 15 cr. hrs. in psych.

Open only to Psych. majors.

Introduction to clinical psychology through lectures, small group discussions, tapes, and films; emphasis on research and professional problems and methods which deal with these problems. Schwebel.

**539 U G 3****Mental Hygiene for Professional Workers**

Su, A, W, Sp. 3 cl.

Prereq.: 10 cr. hrs. in psych.

Not open to students with credit for 640.

The determinants of maladjustment and principles used in the prevention of maladjustment for teachers, personnel workers, social workers, psychologists, occupational therapists, and other professional groups. Fletcher and Kaul.

**540 U G 3****Counseling Psychology: An Introduction**

Su, A, W, Sp. 3 cl.

Prereq.: 10 cr. hrs. in psych.

For students interested in counseling and personnel work; discussion of counseling psychology, counseling, and testing. Walsh and Kaul.

**541 U G 3****Educational and Vocational Appraisal**

Su, A, W. 3 cl.

Prereq.: 10 cr. hrs. in psych.

Theory and techniques of appraisal of individual characteristics as related to the formulation of future educational and vocational plans. Walsh.

**542 U G 3**

**Vocational Psychology**

Su, A, Sp. 3 cl.

Prereq.: 10 cr. hrs. in psych.

Survey of the psychological aspects of work and their implication for vocational development; the use of labor force and occupational information in vocational choice. Campbell.

**550 U G 3**

**Psychology of Childhood**

Su, A, W, Sp. 3 cl.

Prereq.: 10 cr. hrs. in psych.

Presentation of psychological aspects of growth and development in middle childhood.

**551 U G 3**

**Adolescence**

Su, A, W, Sp. 3 cl.

Prereq.: 10 cr. hrs. in psych.

A study of the outstanding characteristics of the adolescent, the educational and social problems arising at this period, and means for dealing with the problem. Angelino, Horrocks, and Jackson.

**560 U G 3**

**Educational Psychology**

Su. 3 cl.

Prereq.: 10 cr. hrs. in psych.

Critical appraisal of the implications for education of modern psychological findings in advanced educational psychology.

**571 U G 3**

**Psychology of Developmental Disability**

A, W. 3 cl.

Prereq.: 10 cr. hrs. in psych. or permission of instructor.

The psychological problems of exceptional children including learning disorders, sensory defects, physically handicapped, emotionally disturbed, and other developmental disabilities. Edmonson.

**H599 U G 3**

**Honors Course**

A, W, Sp. 3 cl.

Prereq.: Permission of departmental Undergraduate Program Committee.

Repeatable to a maximum of 9 cr. hrs.

A program of readings, conferences, and reports selected to provide maximum individual development and preparation for graduate study in the field. Owen, Erickson, and Shulman.

**600 U G 4**

**Psychology of Learning**

Su, A. 4 cl.

Prereq.: 101 or equiv.

The principles that underlie the discovery, fixation, and retention of new modes of human behavior; emphasis on theoretical formulation of the necessary conditions of learning and forgetting. Johnson and Wickens.

**601 U G 3**

**Comparative Psychology**

A. 2 cl., 1 2-hr. lab.

Prereq.: 20 cr. hrs. in psych. or permission of instructor.

Principles of animal behavior, with emphasis upon the contributions of zoology and B. F. Skinner. Hothersall.

**603 U G 3**

**Visual Perception**

W. 3 cl.

Prereq.: 310 or permission of instructor.

Not open to students with credit for 503.

Phenomena, theory, and methods in the study of vision and visual perception as a model for sensory and perceptual processes. Owen.

**604 U G 4**

**Psychology of Language**

W. 2 2-hr. cl.

Prereq.: 100.

Introductory survey of the psychological research on language behavior; emphasis on understanding both language processes in the adult speaker and a child's acquisition of language.

**609 U G 3**

**Introduction to Markov Learning Models**

A. 2 1½-hr. cl.

Prereq.: 220 and 221.

An introductory review of model building in psychology with special emphasis on Markovian mathematical techniques; detailed examination of two or three Markovian learning models. Erickson.

**610 U G 3**

**Introduction to Quantitative Learning Models**

W. 3 cl.

Prereq.: 609.

A continuation of 609; emphasis on non-Markovian models.

**611 U G 3**

**Educational Testing**

Su. 3 cl.

Prereq.: 15 cr. hrs. in psych.

A service course for those majoring in elementary and secondary education, guidance, school psychology, and school administration; stress on use of measurements in school.

**615 U G 3**

**Introduction to Mathematical Psychology**

A. 3 cl.

Prereq.: 510 or equiv.

Survey of current topics in mathematical psychology; topics include measurement and scaling, decision theory, signal detection theory, information theory, and mathematical learning theory.

**620 U G 5**

**Human Performance**

A, Sp. 5 cl.

Prereq.: 220 and 12 cr. hrs. of Psychol. beyond the introductory level.

Information processing in human behavior; topics include signal detection, attention, memory, and models of cognitive processes.

**621 U G 3****Psychology of Individual Effectiveness**

W. 3 cl.

Prereq.: 521 or grad. standing.

Description, prediction, and control of individual, social, and task-related determiners of individual behavior and effectiveness.

**622 U G 3****Psychology of Organizational Effectiveness**

Sp. 3 cl.

Prereq.: 521 or graduate standing.

Central concepts of organization, and analysis of underlying behavioral assumptions; social processes as constraints on organizations; measurement of organizational outcomes; theory of organizational processes. Wood.

**623 U G 3****Human Motivation**

W. 3 cl.

Prereq.: 220 or permission of instructor.

Overview of theory and research in the explanation of the direction and level of human behavior in real life settings. Wood.

**630 U G 3****Psychology of Public Attitudes**

A. 3 cl.

Prereq.: 320 and 220 or equiv.

Attitude organization and change; study of the determinants of attitude. Ostrom.

**632† U G 3****Prejudice and Personality**

A. 3 cl.

Prereq.: 220.

Social psychological theories of group conflict; personality dynamics in prejudice; approaches to the reduction of intergroup hostility.

**635† U G 3****Psychology in Eastern Europe**

W. 1 3-hr. cl.

Prereq.: 10 cr. hrs. in psych. or grad. standing or permission of instructor.

A survey of the approaches and bibliography of the psychology of human behavior with emphasis on the USSR. Brock.

**661 U G 3****Psychology of the Adult Years**

W. 3 cl.

Prereq.: 15 cr. hrs. in psych.

Study of theory, methodology and research related to psychological changes through adulthood and old age, focusing on developmental changes through the adult life span.

**662 U G 3****Psychology of Creativity**

A. 3 cl.

Prereq.: 15 cr. hrs. in psych. or permission of instructor.

A critical examination of conceptual, theoretical, and methodological problems related to the systematic study of creativity; special attention to background factors related to creative behavior. Clark.

**671 U G 3****Principles and Economy of Learning**

Su, Sp. 3 cl.

Prereq.: Grad. standing or 10 cr. hrs. psych.

Principles involved in the control of learning in school with emphasis upon educational technology.

**680 U G 3****The Intellectual Deviate**

Su, Sp. 3 cl.

Prereq.: Permission of instructor.

Theory and concepts of mental retardation, slow learner; causation, diagnosis, and treatment of social, personal, and educational problems of persons so labeled.

**682 U G 3****Principles of Treating the Problem Child**

W. 3 cl.

Prereq.: 15 cr. hrs. in psych.

Methods used in dealing with behavior and personality problems of children.

**684 U G 3****Delinquent Behavior**

A, Sp. 3 cl.

Prereq.: 15 cr. hrs. in psych.

The meaning and significance of delinquency in a cultural context; its psychological basis from a theoretical and empirical framework; present modes of detection and treatment. Angelino.

**693 U G 1-15****Individual Studies**

Su, A, W, Sp.

Prereq.: 16 cr. hrs. in psych. and permission of instructor.

Repeatable to a maximum of 30 cr. hrs. for undergraduates and to a maximum of 45 cr. hrs. for graduates in any combination of decimal subdivisions. Individual reading or research projects by special agreement between instructor and student.

**693.01 Clinical Psychology****693.02 Counseling Psychology****693.03 Developmental Psychology****693.04 Experimental Psychology****693.05 Industrial Psychology****693.06 Quantitative Psychology****693.07 Social Psychology****H699 U 3****Honors Seminar  
in Clinical/Counseling Psychology**

Prereq.: Junior or senior standing and permission of instructor.

Repeatable to a maximum of 9 cr. hrs. for each decimal subdivision.

Designed to give advanced undergraduate Psychology majors an opportunity to gain academic and practical knowledge about clinical/counseling psychology.

**H699.01† Problems and Issues**

A, W, Sp. 3 cl. and/or 3 lab. hrs.

**H699.02† Field Experience**

A, W, Sp. 1 cl. and/or 9 lab. hrs.

Faculty supervised experience in field research and practice.

**H699.03 Orientation of New Psychology Majors**

W. 1 cl. and/or 9 lab. hrs.

Supervised experience in orienting new Psychology majors.

**Introduction to National Security**

(See Nat. Sec. Pol. S. 702.)

**731 U G 3****Individual Differences**

Sp. 3 cl.

Prereq.: 220 or 510; 340 and 550 or 551.

Review of major dimensions of individual differences, their developmental history, and significance for psychological generalizations and for the design of educational curricula.

**763† U G 3****Hereditary Components of Human Behavior**

Sp. 3 cl.

Prereq.: Graduate standing or 20 cr. hrs. in psych. and permission of instructor.

Emergence and elaboration of awareness over the evolutionary span; analysis of mind as a psychological construct.

**Research Principles and Techniques in National Security**

(See Nat. Sec. Pol. S. 785.)

**788 U G 3****Laboratory in Industrial Psychology**

1 cl., 4 lab. hrs.

Prereq.: 510 or equiv. and permission of instructor.

Repeatable in different sections to a maximum of 12 cr. hrs.

**788.01† Attitude and Morale Scales**

W.

Wood.

**788.02 Measurement of Individual Effectiveness**

Sp.

Wallace.

**788.03 Measurement of Organizational Effectiveness**

A.

Wood.

**788.04 Merit Rating**

W.

Wherry.

**794 U G 3****Group Studies**

Su, A, W, Sp. 3 cl.

Prereq.: 15 cr. hrs. in psych. at 500 level or above and permission of instructor.

Repeatable to a maximum of 30 cr. hrs.

The topics vary from quarter to quarter and will be announced at least one month in advance.

**800 G 3-15****Advanced Experimental Laboratory**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Advanced training in the experimental and quantitative methods in the several areas of general experimental psychology and comparative psychology.

**Seminar in National Security Research**

(See Nat. Sec. Pol. S. 801.)

**801 G 4****Advanced Theoretical Psychology**

Sp. 4 cl.

A description and evaluation of the major advanced psychological behavior theories. Wickens.

**802 G 3****Advanced Psychology of Motivation**

Sp. 3 cl.

Prereq.: 20 cr. hrs. in psych. including 311 or 600 or permission of instructor.

An evaluation of the experimental and theoretical material on: physiological drives; development and maintenance of secondary motives; perception and motivation, conflict. Spitzner.

**803 G 3****Theories of Perception**

Sp. 3 cl.

Prereq.: 310 and 501 or permission of instructor.

Theoretical interpretations of the phenomena, problems, and experimental data of perception, including influences of development and learning. Owen.

**804 G 3****Advanced Comparative Psychology**

Sp. 3 cl.

Prereq.: 601.

Contemporary literature in comparative psychology. Mothersall.

**805 G 3****Psychophysiology of the Special Senses**

Su. 3 cl.

Prereq.: 502 or 503 or permission of instructor.

A survey of the basic physiology of the senses and the peripheral nervous system; emphasis on receptor mechanisms and neural coding processes.

**806 G 3****Neuropsychology I**

A. 3 cl.

An introduction to the principles governing neural integrative mechanisms; morphology of nervous systems of the vertebrates; transmission in individual neurons; properties of junctions in integrative networks; elementary laws or reflex action. Meyer.

**807 G 3****Neuropsychology II**

W. 3 cl.

Prereq.: 806.

Functional differentiation of the nervous systems of vertebrates; properties of principle division of the brain; organizations of the forebrain; mechanisms of sleep and waking rhythm; mechanisms of perception. Meyer.

**808 G 3****Neuropsychology III**

Sp. 3 cl.

Prereq.: 807.

Neural mechanisms of motivation and behavioral plasticity; control of major cyclical phenomena, including hunger, thirst, and reproduction; reactions to aperiodic and continued stresses; mechanisms of the learning process. Meyer.

**809 G 3****History and Systems of Psychology**

Su, A. 3 cl.

Prereq.: 16 cr. hrs. in psych.

Development of psychology from the philosophical antecedents to its present status as a science and a profession; assignments in original sources as far as possible. Hothersall.

**810† G 5****Methodological Foundations of Experimental Psychology**

W. 5 cl.

Problems of definition of psychological concepts, formulation and testing of hypotheses, theory, construction, and formulation of empirical generalization with reference to design of psychological experiments. Johnson.

**811 G 2****Seminar in Experimental Psychology**

A, W, Sp. 2 cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 30 cr. hrs.

**812† G 1****Contemporary Psychological Literature**

Sp. 1 cl.

Briggs.

**813 G 3****Psychology as Science and Profession**

A. 3 cl.

Open only to graduate students in Psych.

Orientation for incoming graduate students, including the roles and responsibilities of psychologists, a departmental history, and a sampling of current substantive interests and research methodologies.

**814† G 3****Psychophysiology of Behavior Disorders**

W, Sp. 3 cl.

Prereq.: 502 or 806 or permission of instructor.

An examination of current experimental research on the neuro-electrical, neuro-chemical, CNS structural correlates of behavior disorders.

**815 G 3****Decision Processes**

A. 3 cl.

Prereq.: Grad. standing in Psych., undergrad. inferential statistics strongly recommended.

Introductory course in the application of statistical decision theory as a normative model and analytic technique in the experimental study of cognitive processes.

**816 G 3****Human Performance Theory**

W. 3 cl.

Prereq.: 620 or permission of instructor.

Research and theory on the discrete and on the continuous cases of human information processing; topics include input processes, central processing functions, and output processes. Briggs.

**817 G 3****Seminar in Human Performance**

W, Sp. 3 cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 18 cr. hrs.

Briggs, Shulman, and Wise.

**819 G 2****Seminars in Industrial Psychology**

2 cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

a.† Psychology of Individual Effectiveness.

Sp.

Klimoski.

b. Psychology of Organizational Effectiveness.

Sp.

Wood.

c. Human Motivation.

A.

Wood.

d.† Theoretical Developments and Issues.

A.

Klimoski.

e. Current Practices and Trends.

Su, W.

Wood.

**821 G 2****Research Seminar in Industrial Psychology**

A, W, Sp. 2 cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 12 cr. hrs.

Advanced training in the psychology of individual and organizational effectiveness, emphasizing quantitative and experimental methods. Hakel, Klimoski, and Wood.

**822 G 3****Psychological Assessment**

A. 3 cl.

Prereq.: 510.

A critical survey and evaluation of concepts and techniques of assessment of intelligence, special aptitudes, and personality. Damarin.

**823 G 3****Theory of Test Construction**

W. 3 cl.

Prereq.: 511 or 611 or equiv.

Review of major approaches including traditional mental test theory, assessment theory, and decision theory in relation to constructing and use of various types of tests. Damarin.

**824 G 2****Seminar in Psychological Measurement**

2 cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 10 cr. hrs. in any combination of decimal subdivisions.

**824.01 The Measurement of Cognitive Functions**

Sp.

Damarin.

**824.02 Models for Psychophysics**

W.

Isaac.

**824.03 Models for Psychological Scaling**

Sp.

Isaac.

**824.04\* Models for Psychological Testing**

Damarin.

**824.05\* Models for Interpersonal Analysis**

A.

Ostrom.

**825 G 4****Statistics in Psychology I**

A. 3 cl., 2 lab. hrs.

Prereq.: Grad. standing in Psych.

First of a two-quarter sequence in inferential statistics; basic concepts of sets, probability, distributions, and foundations of inference and estimation; special applications to psychology. Isaac.

**826 G 4****Statistics in Psychology II**

W. 3 cl., 2 lab. hrs.

Prereq.: 825 or equiv.

Continuation of 825; theoretical justification and uses of various inferential techniques; topics:  $t$ ,  $X^2$ ,  $F$  distributions, correlation and regression, non-parametric techniques. Briggs.**827 G 4****Analysis of Variance**

Sp. 4 cl.

Prereq.: 825 and 826, or equiv.

A coverage of statistical inference in analysis of variance designs; analysis of variance designs include randomized blocks, repeated measures, mixed models, and related contrast tests.

**828 G 4****Correlational Analysis**

A. 4 cl.

Prereq.: 810 or permission of instructor.

Techniques and rationale of using quantitative and qualitative data for prediction; test and battery analysis and validation. Wherry.

**829 G 4****Quantitative Foundations of Psychological Statistics**

W. 4 cl.

Prereq.: 510 or equiv.

Principles and techniques for deriving statistical equations; their modification to handle special cases; clarifying assumptions and their application. Erickson.

**830 G 3****Machine Programming for Psychological Research**

Su, Sp. 3 cl.

Prereq.: 828, Math. 241, and permission of instructor.

An introduction to mnemonic symbolic language and loop theory; applications to the more common psychological statistical problems will be stressed. Wherry.

**831 G 2****Seminars in Psychological Statistics**

2 cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 18 cr. hrs.

- a. Analysis of Variance.  
A.  
Briggs.
- b. Experimental Design.  
W.  
Isaac.
- c. Factor Analysis.  
Su, W.  
Wherry.
- d. Mathematical Models and Theory.  
Su.  
Erickson.
- e. Non-Parametric Statistics.  
Su, Sp.  
Wherry.
- f.† Advanced Experimental Design.
- g.† Advanced Multivariate Analysis.
- h.† Computer Simulation Research.
- i. Current Practices and Trends.  
Su.  
Isaac.

**833 G 3****Statistical Problems in Developmental Psychology**

W. 3 cl.

Prereq.: 826 and 827 or 828; and permission of instructor.

Repeatable to a maximum of 6 cr. hrs.

A bridge from formal statistics to current research in developmental and educational psychology with repeated measure, time series data, indices of change, etc.

**834 G 3****Psychology of Infancy**

A. 3 cl.

Prereq.: 837 or permission of instructor.

Not open to students with credit for 550.

Psychological development during the first four years of life with particular reference to neonatal period and research methodology in studies involving infants. Wenar.

**835 G 3****Child Development**

A. 3 cl.

Prereq.: 837 or permission of instructor.

Major developmental aspects of childhood; review of theory, methodology, research studies, and historical and contemporary writing about children; consideration of interdisciplinary approaches. Thompson.

**836 G 3****Adolescent Development**

Sp. 3 cl.

Prereq.: 837 or permission of instructor.

Major developmental aspects of adolescence; review of theory, methodology, research studies, and historical and contemporary writing about adolescents; consideration of interdisciplinary approaches. Horrocks.

**837 G 3****Nature and Direction of Human Development**

A. 3 cl.

Critical consideration of human development, selected theories and methods of investigation including units of measurement; emergence of mind considered through the phylogenetic and ontogenetic sequence. Horrocks.

**838 G 2****Interaction of Developmental Learning Functions**

W. 2 cl.

Prereq.: 550 or 835 and 600 or 671 or equiv.

Relation of empirical data on imprinting, sensory and motor deprivation, and environmental extensions upon theoretical construction designed to integrate such data. Thompson.

**839† G 3****Comparative Child Rearing Practices**

A. 3 cl.

Prereq.: 835 and 836 or equiv., and Anthro. 520 and permission of instructor.

Comparative survey of familial and community childrearing practices in modern and primitive cultures; psychological and theoretical implications of various practices; review of research methodology. Angelino.

**840 G 3-9****Practicum in Developmental Psychology**

Su, A, W, Sp. 1 cl., lab. hrs.

Prereq.: 2nd yr. grad. standing in Psychol., 837, 838 and permission of instructor.

Repeatable to a maximum of 9 cr. hrs.

Observation of children in a representative variety of clinical settings with particular reference to developmental phenomena of growth and behavior; application of research, diagnostic and intervention methodology. Helper, Leland, and Wenar.

**841 G 1****Symposium in Developmental Literature**

A, W, Sp. 1 cl.

Prereq.: Permission of instructor.

Critical review of current research literature in developmental psychology. Horrocks.

**842 G 3****Seminar in Developmental Psychology**

2 cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 30 cr. hrs.

- a. Current Theoretical Issues.

Su, A, W, Sp.

Horrocks.

- b. Development of Dimensions of Cognitive Functions.

A, Sp.

Thompson.

- c. Development of Social Attitudes and Values.

A, Sp.

Helper.

- d.† Cultural Influences on Human Development.

Sp.

Clark.

- e.† Psychological Variables in Growth.

A.

Wenar.

- f.† Development of Creative Behavior.

A.

Clark.

- g.† Deviate Behavior in Childhood and Adolescence.

A.

Horrocks.

- h.† Phylogenesis.

- i.† Aging and Senescence.

- j.† Sequential Phenomena of Growth and Degeneration.

Su.

Damarin.

- k.† Developmental Aspects of Language.

**843 G 3****Theories of Human Development**

3 cl.

Prereq.: 837.

Comparative presentation of significant major historical and modern developmental theories with specific evaluation of their relevance in the formulation of a comprehensive psychological theory. Horrocks.

**843.01 Analytic and Social Learning Theories**

W.

**843.02 Cognitive, Organic and Structural Theories**

Sp.

**844 G 2****Psychopathology of Childhood**

W. 2 cl.

Prereq.: 837 and permission of instructor.

A study of psychopathological conditions of childhood, such as autism, schizophrenia, neurosis, acting out, and behavior problems from a developmental point of view. Wenar.

**845 G 3****Child Psychotherapies**

W. 1 2½-hr. cl.

Prereq.: 844 or equiv. and permission of instructor.

Study of several major modes of psychotherapy with children; consideration of theoretic foundations, principal techniques, range of applicability, and presumed means of effecting change. Rie.

**846 G 3****Advanced Educational Psychology**

Sp. 3 cl.

Prereq.: Permission of instructor.

Critical consideration of research and theory in developmental learning and measurement as relevant to education; special attention to historical positions, assumptions, and current literature. Clark.



847† G 2

**Psychological Problems in Higher Education**

Sp. 2 cl.

Designed to give graduate students preparing for college teaching positions contact with current educational research regarding the psychological problems they will encounter. Horrocks.

848 G 2

**Seminar in the College Teaching of Educational Psychology**

A, W, Sp. 2 cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 6 cr. hrs.

The objectives of educational psychology in teacher education; a presentation of practical problems in organization, development, and evaluation of undergraduate courses in educational psychology. Angelino and Kaul.

849 G 2

**Seminar in Educational Psychology**

A, W, Sp. 2 cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 30 cr. hrs.

Angelino and Clark.

850 G 3

**Adaptive Behavior and Developmental Disability**

Sp. 3 cl.

Prereq.: 857 or permission of instructor.

Overview of the psychology of adaptation and its relationship to the classification, assessment, and modification of mental retardation and developmental disability. Leland.

852† G 3

**Behavioral Change Techniques with Children**

W, Sp. 1 cl., 4 lab. hrs.

Prereq.: 571 or equiv., 600 and permission of instructor.

Research and theory on behavior change methodology; practice with behavior change techniques.

**852.01 Behavior Modification**

Theory and practice of behavior modification; emphasis on experience with individual children and consultation within the school setting.

**852.02 Group Behavior Modification**

Theory and practice of group behavior modification, with an emphasis on the management of classroom behavior.

853 G 3

**Psychology of the Exceptional Child and Adult**

Su. 3 cl.

Prereq.: 571 and permission of instructor.

Review and evaluation of theoretical and research literature concerning exceptional children and adults. Leland and Edmonson.

855† G 3

**Child Behavior Assessment and Consultation**

1 cl., 4 lab. hrs.

Prereq.: Permission of instructor.

Theory of psychological assessment and consultation; practice in observation, interviewing, testing, documentation of behavior, writing reports and consulting on the learning and behavioral problems of children.

**855.01 Assessment of Intelligence**

Theories of cognitive functioning; practice with individual intelligence tests.

**855.02 Assessment of Personality and Behavioral Disorders in Children**

Cognitive, psychodynamic and phenomenological approaches to the assessment of personality in children, including practice with projective and self-report techniques.

857 G 4

**Psychological Problems in Mental Retardation**

A. 4 cl.

Prereq.: Permission of instructor.

Advanced study of psychological aspects of mental retardation; topics include theories of mental retardation, studies of sensory and perceptual processes, cognitive chronically ill and neurologically impaired. Leland.

858† G 4

**Psychological Problems in Physical Disability**

Sp. 4 cl.

Prereq.: Permission of instructor.

Advanced study of cognitive and non-cognitive functioning in those with motor and sensory disabilities, and the chronically ill and neurologically impaired.

859 G 2

**Seminars in the Psychology of Exceptional Children and Adults**

W. 2 cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 6 cr. hrs.

Advanced topics in research strategies and methodology; specialized topics on the growing edge of the psychology of exceptional children and adults. Angelino and Leland.

860† G 3

**Theories of Personality**

A. 3 cl.

Prereq.: Advanced work in personality and social psych. and permission of instructor.

A critical consideration of the theories of personality structure and origin. Mirels.

861

**Clinical Psychology**

Prereq.: Permission of instructor.

Introduction to the theory and use of clinical methods in psychology, designed for first-year graduate students in clinical psychology. Kaswan.

**861.01 Lecture**

A. 3 cl.

Repeatable to a maximum of 9 cr. hrs.

G 3

**861.02 Seminar and Practicum**

A. 1 or 2 cl. and/or 2-4 lab hrs.

Repeatable to a maximum of 6 cr. hrs.

G 2

**862****Problems of Human Behavior**

Prereq.: Permission of instructor.

Introduction to the study of human behavior problems; practicum involves observation and participation in field settings. Kaswan.

**862.01 Lecture** **G 3**

W. 2 cl.

Repeatable to a maximum of 6 cr. hrs.

**862.02 Practicum** **G 1 or 2**

W. 2-4 lab. hrs.

Repeatable to a maximum of 6 cr. hrs.

**863****Psychological Dynamics**

Prereq.: Permission of instructor.

Special topics in the study of behavior.

**863.01 Lecture** **G 3**

Sp. 3 cl.

Repeatable to a maximum of 9 cr. hrs.

**863.02 Practicum** **G 2**

Sp. 2-4 lab. hrs.

Repeatable to a maximum of 6 cr. hrs.

**864****Psychological Appraisal**

Prereq.: Permission of instructor.

Courses (except 864.01) ordinarily involve both classroom and practicum experiences.

Concepts and procedures for appraising human behavior.

**864.01† Lecture** **G 3**

Sp. 3 cl.

Theories and methods of psychological appraisal; integration of different theories and approaches.

**864.02† Cognitive Appraisal** **G 1-4**

Sp. 1-4 cl. and/or 8 lab. hrs.

Repeatable to a maximum of 8 cr. hrs.

**864.03† Projective Appraisal** **G 1-4**

W. 1-4 cl. and/or 2-8 lab. hrs.

Repeatable to a maximum of 8 cr. hrs.

**864.04† Acturial Appraisal** **G 1-4**

W. 1-4 cl. and/or 2-8 lab. hrs.

Repeatable to a maximum of 8 cr. hrs.

**864.05† Behavior Analysis** **G 1-4**

A. 1-4 cl. and/or 2-8 lab. hrs.

Repeatable to a maximum of 8 cr. hrs.

**864.06 Special Topics** **G 1-4**

Su. 1-4 cl. and/or 2-8 lab. hrs.

Repeatable to a maximum of 8 cr. hrs.

**865****G 1-5****Group Interventions**

A, W, Sp. 1-5 cl. and/or 2-10 lab. hrs.

Prereq.: Permission of instructor.

Courses ordinarily involve both classroom and practicum experience.

Each decimal subdivision repeatable to a maximum of 15 cr. hrs.

Principles and practices of intervention through group processes.

**865.01 Group Psychotherapy****865.02 Family Therapy****865.03 Interventions in Organized Groups****865.04† Encounter Group Processes****865.05 Novel and Experimental Group Processes****866****G 1-5****Interventions with Individuals**

A, W, Sp. 1-5 cl. and/or 2-10 lab. hrs.

Prereq.: Permission of instructor.

Courses ordinarily involve both classroom and practicum experience.

Each decimal subdivision repeatable to a maximum of 15 cr. hrs.

Concepts and practices of various interventions into the troubled behavior of individuals.

**866.01 Individual Psychotherapy****866.02 Behavior Modification****866.03† Existential and Humanistic Approaches****866.04† Novel and Experimental Approaches****867†****G 2 or 4****Seminar in Clinical Abnormal Psychology**

A, W, Sp. 2 cl.

Prereq.: Permission of instructor.

Two sections may be offered in any one qtr.

**868****G 5****Community Psychology**

A, W, Sp. 2 cl., 6 lab. hrs.

Prereq.: 2nd yr. of grad. study; permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Given as a year sequence. No new students will normally be admitted for the Winter and Spring Quarters.

Integrate ecological, social, and interpersonal variables in the analysis and change of behavior; participant observation and research in community settings. Kaswan

**869****G 2****Research Methodology**

A, W, Sp. 2 cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 24 cr. hrs.

Discussion of conceptual and methodological issues related to the ongoing work of graduate students and faculty.

**870****G 3****Advanced Social Psychology**

A. 3 cl.

Prereq.: 25 cr. hrs. in psych. including 320 and 802 or 600 or equiv.

Problems of learning and perception relative to the social environment, the influence of culture in the development of individual behavior patterns, and related topics. Brock.

**871†****G 3****Counseling and Therapy as a Social Institution**

A. 3 cl.

A review of diverse helping practices as belief and ritual, with emphasis upon their functions in American society.

**872 G 3-12****Social Psychology Laboratory**

A, W, Sp. 2 cl., 2 lab. hrs. for each additional cr. hr.

Prereq.: Permission of instructor.

Repeatable to a maximum of 12 cr. hrs.

Advanced training in methods and data collection in the areas of social psychology, laboratory, and field experience. Brock, Greenwald, Latane, and Ostrom.

**873 G 3****Seminar in Social Psychology**

3 cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 18 cr. hrs.

- a. Contemporary Attitude Theory and Research.  
W.  
Greenwald.
- b.† Social Structure and Personality.  
Sp.  
Ostrom.
- c.† Systematic Theory in Social Psychology.  
W.  
Brock.
- d.† The Psychology of Social Movements.  
W.
- e. Current Research Trends.  
W.  
Latane.
- f.† Group Processes.  
W, Sp.  
Latane.

**874 G 3****Cognitive Processes**

Su, Sp. 3 cl.

Prereq.: 20 cr. hrs. in psych. or permission of instructor.

Theories of complex information processing functions and their acquisition; special attention to the role of language in complex perceptual and motor performances. Greenwald.

**875 G 4****Practicum in Social Psychology**

A, W, Sp. 2 cl., 2 lab. hrs.

Prereq.: Grad. standing in Psych. or permission of instructor.

Survey and supervised experience in using the technique and research designs of social psychology. Brock.

- 875.01 Practicum in Social Psychology I  
W.
- 875.02 Practicum in Social Psychology II  
Sp.
- 875.03 Practicum in Social Psychology III  
A.

**877 G 4****Human Learning I: Learning**

A. 2 2-hr. cl.

Introductory survey of the theoretical and empirical issues in human learning; emphasis on the analysis of learning tasks and the conditions under which learning occurs.

**878 G 4****Human Learning II: Memory**

W. 2 2-hr. cl.

Theoretical issues and experimental research on the topic of human memory.

**879 G 4****Human Learning III: Cognitive Processes**

Sp. 2 2-hr. cl.

Theoretical and experimental research in several areas of cognition including concept learning, problem solving, and reasoning.

**881 G 2****Administrative Leadership in Counseling and Personnel**

Sp. 2 cl.

Prereq.: Permission of instructor.

Advanced graduate students relate organizational theory and concepts of interpersonal relations to administrative practice in educational and community settings. Stewart.

**882****Psychology of Counseling**

Prereq.: 13 cr. hrs. in psych., and (for the practicum) permission of instructor.

Assumptions and facts fundamental to counseling; factors in the interview situation; nature of counseling techniques; resources in counseling; relation of counseling to other personnel procedures.

**882.01 Lecture G 3**

Su, A, W, 3 cl.

Fletcher and Schmidt.

**882.02 Practicum G 2**

A, W. 4 lab. hrs.

Shaw.

**883****Counseling Diagnostics**

Prereq.: 510 or equiv., 511 or equiv., and (for lab.) permission of instructor.

Theory and application of interview data, observed behavior, test results, and biographical information as a basis for diagnostics in counseling and evaluation.

**883.01 Lecture G 3**

W. 3 cl.

Fletcher.

**883.02 Practicum G 2**

W. 4 lab. hrs.

Fletcher.

**884****Psychology of Career Development****884.01 Lecture G 3**

Sp. 3 cl.

A survey and critical analysis of literature and research regarding effects of sequence of work activity, vocational exploration, and career development. Osipow.

**884.02 Laboratory G 1**

Sp. 1 2-hr. lab.

Prereq.: 882 or equiv. and permission of instructor.

A series of practical exercises designed to apply the principles of the psychology of career development. Osipow.

**885 G 3****Beginning Practicum in Counseling**

Su, A, Sp. 1 cl., 4 lab. hrs.

Prereq.: 883 and permission of instructor.

Repeatable to a maximum of 6 cr. hrs.

Supervised practice in assisting college students in their adjustment to college; emphasis on diagnosis and treatment; special help given to interviewing procedures. Stewart and Walsh.

**886 G 2-3****Advanced Practicum in Counseling**

A, W, Sp. 1 cl., 2 lab. hrs. for each hr. of additional cr.

Prereq.: 885 and permission of instructor.

Repeatable to a maximum of 9 cr. hrs.

Supervised practice in (a) assisting college students and adults with problems of personality adjustments or (b) supervising techniques through observation and discussion of work with other counselors.

**887 G 2****Seminar in Counseling Psychology**

Su, A, W, Sp. 2 cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

**888 G 3****Psychological Study of Individuals and Groups**

W. 3 cl.

Prereq.: Permission of instructor.

Not open to students with 6 cr. hrs. in 650.

Basic concepts and techniques of student personnel work. Rodgers.

**899 G 1-5****Interdepartmental Seminar**

Sp.

(See under Interdepartmental Seminars.)

**980 G 1-15****Supervised Field Experience in Psychology**

Su, A, W, Sp.

Prereq.: Psych. 2nd yr. standing and approval of local staff of area in which student is specializing. (Supervised by member of local staff and some member of the outside agency approved by the Dept. of Psych.)

Repeatable to a maximum of 30 cr. hrs.

Supervised experience, either research or operational, in any agency doing professional psychological work such as a school system, a psychological clinic, an industrial personnel department, or a counseling center.

**999 G Arr.****Research in Psychology**

Su, A, W, Sp.

Research for thesis or dissertation purposes only.

**Public Administration**

Office: 302 Hagerty Hall, 1775 College Road

**Professors** Oster (Director), Craig, Enarson, Hunker, Lundstedt, Lynn, Ripley, Rutledge, Snyder, Stocker, and Widner; **Associate Professors** Rettig and Stanley; **Assistant Professors** Campagna, Gonyea, and Krasniewski.

**800 G 3****Research Methods in Public Administration**

Sp. 1 2-hr. cl.

Methods of research in public administration including the design of thesis and dissertation proposals.

**801 G 3****Introduction to Public Administration**

A. 1 3-hr. cl.

Critical analysis of the environmental constraints upon the problem-solving role of the administrator in the public sector environment; examination of structure, processes, and problems. Craig and Rettig.

**802 G 3****Legal Environment of Public Administration**

W. 1 3-hr. cl.

An examination and analysis of the constraints imposed upon public administrative processes by the legal environment including judicial policy-making and the evolving legal order. Lynn.

**803 G 3****Seminar on Public Policy Formulation**

Sp. 1 3-hr. cl.

Prereq.: 801 and 802.

Study of the policy formulation process in a political setting emphasizing the management or resolution of conflict within a public bureaucracy; selected cases. Lundstedt.

**804 G 3****Seminar on Governmental Information Systems Administration**

A. 2 1½-hr. cl.

Prereq.: Acc. 712 or equiv. or permission of instructor.

Critical study of the administration and design of management information systems for public agencies; selected case studies. Lundstedt.

**805 G 3****Seminar on Systems Analysis for Public Policy Decisions**

W. 2 1½-hr. cl.

Prereq.: 801, 802, 803, 804, Econ. 501, and Bus. Admin. 801.02 or permission of instructor.

Studies in the application of systems analysis to administrative and policy problems in the public sector; selected case studies and problems. Mullins.

806

G 3

**Seminar on Planning and Program Budgeting**

Sp. 2 1½-hr. cl.

Prereq.: 804 or equiv. and Econ. 501 or equiv. or permission of instructor.

Critical analysis of the administration and design of a planning, programming, and budgeting system; examination of case studies emphasizing applied and theoretical problems. Craig and Stanley.

850

G 3

**Policy Problem Seminar I**

W.

Prereq.: Permission of instructor.

Multidisciplinary seminar integrated with field experience in the solution of actual public administrative and policy problems; organized around problem areas.

851

G 3

**Policy Problem Seminar II**

Sp.

Prereq.: 850.

Continuation of 850.

860

G. Arr.

**Seminar on Advanced Problems in Public Administration**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 6 cr. hrs. in any one subdivision.

Special studies of selected problems which may include readings, case studies, internships, field investigations, simulation, systems analysis, role playing, team teaching, and other experimental techniques.

- 860.01 Comparative Administration
- 860.02 Correctional Administration
- 860.03 Defense Policy Administration
- 860.04 Development Administration
- 860.05 Fiscal Administration
- 860.06 Health Services Administration
- 860.07 Information Systems Administration
- 860.08 Municipal Administration
- 860.09 Natural Resources Administration
- 860.10 Personnel and Labor Relations Administration
- 860.11 Planning Administration
- 860.12 Research Administration
- 860.13 Urban Affairs Administration
- 860.14 Welfare Administration
- 860.99 Special

998

G Arr.

**Research in Public Administration: Thesis**

Su, A, W, Sp.

Repeatable to a maximum of 6 cr. hrs.

Research for thesis purposes only.

999

G Arr.

**Research in Public Administration: Dissertation**

Su, A, W, Sp.

Repeatable to a maximum of 45 cr. hrs.

Research for dissertation purposes only.

## Radiologic Technology

(School of Allied Medical Professions)

Office: 340 School of Allied Medical Professions Building, 1583 Perry Street

Instructors Ballinger (Division Director) and Dings; Clinical Instructors Bullock, Dare, Gabbard, Groff, and Kelch.

201

U 2

**Introduction to Radiologic Technology**

Su. 2 cl.

Prereq.: Permission of instructor.

An orientation to radiologic technology including the history of the profession, responsibilities of the technologist, professional development, radiation protection, areas of specialization, and hospital organization.

411

U 9

**Radiographic Procedures I**

Su. 2 cl., 1 2-hr. lab., 24 hrs. clinical experience.

Prereq.: Permission of instructor.

Analysis of theory in radiography of the chest, the abdomen, and its contents with application of theory in the laboratory and clinical facilities. Dings.

412

U 9

**Radiographic Procedures II**

A. 2 cl., 1 2-hr. lab., 24 hrs. clinical experience.

Prereq.: Permission of instructor.

Continuation of 411 emphasizing the appendicular skeleton and bony thorax. Ballinger.

413

U 9

**Radiographic Procedures III**

W. 2 cl., 1 2-hr. lab., 24 hrs. clinical experience.

Prereq.: 412 or permission of instructor.

A continuation of 412 emphasizing the vertebral column, pelvis, and skull. Ballinger and Dings.

420

U 3

**Radiographic Processing**

Su. 2 cl., 1 2-hr. lab.

Prereq.: Permission of instructor.

A study of the photographic process, including processing methodology and the effects of the chemical components on the radiographic film. Ballinger.

430

U 3

**Radiographic Exposure**

Su. 2 cl., 1 2-hr. lab.

Prereq.: Permission of instructor.

Presents theory to establish radiographic exposure values while emphasizing radiographic quality and the accessory equipment used in the production of a satisfactory radiograph. Dings.

471

U 3

**Radiologic Physics I**

A. 2 cl., 1 2-hr. lab.

Prereq.: Physics 112 or permission of instructor.

An analysis of the production of X rays including X-ray circuitry. Dare.

472 U 3

**Radiologic Physics II**

W. 2 cl., 1 2-hr. lab.

Prereq.: 471 or permission of instructor.

A continuation of 471 emphasizing the interaction of radiation with matter, units of radiation measurement, and radiation protection. Dare.

530 U 3

**Advanced Radiographic Exposure**

A. 2 cl., 1 2-hr. lab.

Prereq.: Permission of instructor.

In-depth study in establishing radiographic exposure values in new installations or when equipment is changed. Dings.

540 U 6

**Clinical Experience in Radiologic Technology**

Su, A, W, Sp. 24 hrs. clinical experience.

Prereq.: Permission of instructor.

Repeatable to a maximum of 24 cr. hrs

Clinical application of radiographic technics in the Radiology Department of The Ohio State University Hospitals. Bullock and Staff.

555 U 5

**Nuclear Medicine Technology**

Sp. 1 cl., 12 hrs. clinical experience.

Prereq.: Permission of instructor.

Identification of radioactive pharmaceuticals and a study of their use in patient diagnosis with application of theory in the nuclear medicine laboratories.

556 U 5

**Pediatric Radiography**

Sp. 1 cl., 12 hrs. clinical experience.

Prereq.: Permission of instructor.

Analysis of theory in pediatric radiography with application in the clinical facilities of Children's Hospital. Gabbard and Groff.

557 U 5

**Radiation Therapy Technology**

Sp. 1 cl., 12 hrs. clinical experience.

Prereq.: Permission of instructor.

Comparison of the various methods of administering in the radiation therapy center. Batley, Ehlers, and Kelch.

565 U 2

**Departmental Operation**

W. 1 2-hr. cl.

Prereq.: Permission of instructor.

A study of the structure and operation of departments of radiology.

590 U 4

**Special Radiographic Procedures**

W. 2 cl., 8 hrs. clinical experience.

Prereq.: Permission of instructor.

Theory and clinical experience in cardiovascular, neurological, and other specialized radiographic procedures.

## Radiology

Office: N-212 University Hospital, 410 West 10th Avenue

**Professors** Nelson (Chairman), Batley, Christoforidis, Molnar, and Myers; **Associate Professors** Riccobono and Stockum; **Assistant Professors** Ehlers, Fulmer, Goldstein, Hart, Hodgson, Johnson, Kartha, Klosterman, and Paul.

670 U P G 2

**Medical Radiation Physics**

Sp. 2 cl.

Prereq.: Permission of instructor.

Ionizing radiations, their production, properties and interaction with materials of medical interest; physical principles of radiation therapy, radiation dosimetry, and radiation protection.

680 U P G 2

**Radiation Biology**

A. 2 cl.

Prereq.: Permission of instructor.

Effect of ionizing radiation in biological systems at the molecular, cellular, organ, organism, and community levels with special emphasis on medical implications and radiation safety.

740 P 6, 12, 18

**Clinical Radiology**

1, 2, 3, or 4 months; offered all months except June, July, Aug.

Prereq.: Permission of instructor.

Repeatable to a maximum of 24 cr. hrs.

Participation in special seminars and clinics; optional research project.

- a. Radiologic diagnosis.
- b. Radiation therapy.

750 P 1

**Advanced Radiology**

1 month, offered Oct. and Feb.

Prereq.: Med. 4th yr. standing.

Clinical clerkship in the Department of Radiology, University Hospital; instruction in radiation therapy and film reading techniques.

793 P 6, 12, 18

**Individual Studies**

1, 2, 3, or 4 months; offered all months except June, July, and Aug.

Prereq.: Permission of instructor.

Repeatable to a maximum of 24 cr. hrs.

Graduated participation in diagnostic and therapeutic radiology; optional research project after 6 credit hours in 793.

999 G Arr.

**Research in Radiology**

Su, A, W, Sp.

Research for thesis purposes only.

## Respiratory Technology

(School of Allied Medical Professions)

Office: 431 School of Allied Medical Professions Building, 1583 Perry Street

**Assistant Professor** Morgan (Division Director); **Instructor** Pilbeam; **Clinical Instructors** Conkle and Hannan.

**480**

### Respiratory Technology

Su, A, W, Sp.

Prereq.: Permission of instructor.

#### **480.05 Components of Respiratory Health** U 1-3

Repeatable to a maximum of 3 cr. hrs.

Survey of normal respiratory mechanisms, the respirable environment, and the role of the technologist. Morgan and Staff.

#### **480.10 Basic Respiratory Technology** U 1-3

Repeatable to a maximum of 3 cr. hrs.

Administration of therapeutic gases and aerosol agents. Morgan and Staff.

#### **480.20† Respiratory Mechanisms** U 1-3

Repeatable to a maximum of 3 cr. hrs.

Consideration of ventilatory dynamics, pulmonary circulation, and respirable gas exchange. Morgan and Staff.

#### **480.30 Advanced Respiratory Technology** U 1-3

Repeatable to a maximum of 3 cr. hrs.

Consideration of design and application of mechanical ventilators. Morgan and Staff.

#### **480.40 Interrelated Therapeutics** U 1-6

Repeatable to a maximum of 6 cr. hrs.

Study of mechanisms of specific disorders, as they relate to various therapeutic measures. Morgan and Staff.

#### **480.50 Selected Studies in Respiratory Technology** U 1-5

Repeatable to a maximum of 5 cr. hrs.

Consideration of selected problems and procedures in respiratory technology. Morgan and Staff.

**489** U 2-10

### Clinical Experience in Respiratory Technology

Su, A, W, Sp. 6-30 hr. field experience a wk.

Prereq.: Permission of instructor.

Repeatable to a maximum of 34 cr. hrs.

Field experience in clinical respiratory technology and related areas. Morgan and Staff.

## Romance Linguistics

Office: 248 Dieter Cunz Hall of Languages, 1841 Millikin Road

**Professors** Griffin (Chairman) and Keller.

**811** G 5

### Romance Linguistics I

A. 5 cl.

Prereq.: Permission of instructor.

A general survey of the development of the Romance languages and an introduction to the basic materials and techniques of investigation. Keller.

**812** G 5

### Romance Linguistics II

W. 5 cl.

Prereq.: 811 or permission of instructor.

Topics and problems, both synchronic and diachronic; special attention to the minor Romance languages. Keller.

**831\*** G 3-5

### Seminar in Romance Linguistics

A, Sp.

Prereq.: Permission of instructor.

Griffin and Keller.

**993** G 1-5

### Individual Studies

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

**994** G 1-15

### Group Studies

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 30 cr. hrs.

Investigation of minor problems in the various fields of Romance Linguistics.

## Rural Sociology

Office: 103 Agricultural Administration Building, 2120 Fyffe Road

**Professors** Boyne (Chairman), McCormick (Associate Chairman), Phillips (Associate Chairman), Adams, R. H. Baker, R. L. Baker, Barr, Baumer, Cravens, Dougan, Ezzell, Hadley, Ingraham, Jacobson, Jones, Mitchell, Moore, Sharp, Shaudys, Sitterley, Smith, Stout, Walker, and Wayt; **Associate Professors** Bauman, Bowen, Darrow, Erven, Hahn, Himes, Hushak, Marion, McDonald, Rask, Simonds, Taylor, P. R. Thomas, Vandemark, and Wessel; **Assistant Professors** Duvick, Francis, Glover, Henderson, Hitzhusen, Larson, Lee, Meyer, Napier, Singh, D. W. Thomas, and Watkins; **Instructors** Pierce, Pugh, and Tucker.

**105** U 5

### Introduction to Rural Sociology

A, W, Sp. 5 cl.

Not open to students with credit for Soc. 101 or 201.

Principles of society, major social institutions and social change; emphasizes social changes in rural life, rural organizations, population, and family living. Francis, Mitchell, Napier, Phillips, and Thomas.

**110** U 5

### Socio-Economic Systems in Rural America

A, W, Sp. 5 cl.

(Cross-listed with the Dept. of Agr. Econ.)

A study of our rural socio-economic systems, the individual's interaction within these systems, and the impact of societal decisions on resource use and control. Hitzhusen, Shaudys, and Thomas.

**205 U 3****Our Changing Rural Society**

W. 3 1-hr. cl.

Prereq.: 105 or Soc. 101.

An examination of factors contributing to the maintenance of rural social systems and the conditions that facilitate change. Napier.

**GENERAL PREREQUISITES FOR COURSES  
NUMBERED 300 AND 400**

Unless otherwise indicated, the prerequisites for 300 and 400-level courses are 90 cr. hrs. in collegiate courses, exclusive of ROTC and Phys. Ed.; or specified course(s) numbered 100-399.

**320 U 5****The Rural Family**

A. 5 cl.

Prereq.: 105, Soc. 101, or 201.

Not open to students with credit for 310.

Structure and functions of rural families in changing societies. Phillips.

**342 U 3****Rural Leadership**

Su, Sp. 1 2-hr. cl., 1 2-hr. lab.

Prereq.: 105, Soc. 101, or 201.

Not open to students with credit for 317.

Basic principles and practices in the development of effective leadership in organization and community action programs; power structures and levels of leadership are examined.

**GENERAL PREREQUISITES FOR COURSES  
NUMBERED 500**

Unless otherwise indicated, the prerequisites for 500-level courses are 15 cr. hrs. in courses in the same discipline numbered 200 or higher, or 10 cr. hrs. in courses numbered 200 or higher in the same discipline, plus 10 cr. hrs. in courses numbered 200 or higher in specified allied disciplines; or baccalaureate degree.

**542 U G 5****Rural Social Organization**

A. 4 cl., 1 2-hr. lab.

Not open to students with credit for 316.

Elements of social organization, functions of formal and informal social systems, process of making decisions in communities; analysis of actual rural community.

**562 U G 3****Diffusion of Information  
on Agricultural Technology**

Sp. 3 cl.

Not open to students with credit for 421.

The process by which new ideas diffuse to the farmer and homemaker; emphasis on the role of group influences, professional agricultural workers, and adoption leaders. Francis.

**593 U G 2-5****Individual Studies**

Su, A, W, Sp.

H593 (honors) may be available to students enrolled in a college honors program or eligible for enrollment.

Prereq.: Permission of instructor.

Each decimal subdivision repeatable to a maximum of 8 cr. hrs.

- 593.01 Human Population Problems**
- 593.02 Rural Family**
- 593.03 Rural Health**
- 593.04 Rural Leadership**
- 593.05 Rural Community and Institutions**
- 593.06 Community Development**
- 593.07 Diffusion of Technology**
- 593.08 Research Methods in Rural Sociology**
- 593.09 Social Organization and Administrative Problems**
- 593.10 Sociology of Foreign Areas**
- 593.11 Rural Church**
- 593.12 Farmer Organizations**
- 593.13 General Rural Sociology**
- 593.14 Rural Social Problems**

**GENERAL PREREQUISITES FOR COURSES  
NUMBERED 600**

Unless otherwise indicated, the prerequisites for 600-level courses are 15 cr. hrs. in courses in the same discipline numbered 300 or higher, or 10 cr. hrs. in courses numbered 300 or higher in the same discipline, plus 10 cr. hrs. in courses numbered 300 or higher in specified allied disciplines.

**642 U G 5****Advanced Rural Sociology**

W. 5 cl.

Prereq.: 15 cr. hrs. in Rur. Soc. and/or Soc. at the 300 level or higher.

Not open to students with credit for 600.

An advanced course on rural society dealing with fundamentals in rural social institutions and organizations, rural social change and nature of rural social systems. Napier.

**662 U G 3****Rural Sociology of Developing Societies**

W. 3 cl.

Prereq.: 105, Soc. 101, or 201.

Not open to students with credit for 422.

Sociological principles applied to analysis of present social systems and institutions of developing nations for students preparing for foreign service with rural societies. Francis.

**693 U G 2-5****Individual Studies**

Su, A, W, Sp.

H693 (honors) may be available to students enrolled in a college honors program or eligible for enrollment.

Prereq.: Permission of instructor.

Each decimal subdivision repeatable to a maximum of 8 cr. hrs.

- 693.01 Human Population Problems**
- 693.02 Rural Family**
- 693.03 Rural Health**
- 693.04 Rural Leadership**
- 693.05 Rural Community and Institutions**



- 693.06 Community Development
- 693.07 Diffusion of Technology
- 693.08 Research Methods in Rural Sociology
- 693.09 Social Organization and Administrative Problems
- 693.10 Sociology of Foreign Areas
- 693.11 Rural Church
- 693.12 Farmer Organizations
- 693.13 General Rural Sociology
- 693.14 Rural Social Problems

#### 694 U G 2-4

##### Group Studies

Su, A, W, Sp.

An intensive study of a selected area in rural sociology appropriate to the needs of the group not provided in other courses.

Each decimal subdivision repeatable to a maximum of 8 cr. hrs.

- 694.01 Human Population Problems
- 694.02 Rural Family
- 694.03 Rural Health
- 694.04 Rural Leadership
- 694.05 Rural Community and Institutions
- 694.06 Community Development
- 694.07 Diffusion of Technology
- 694.08 Research Methods in Rural Sociology
- 694.09 Social Organization and Administrative Problems
- 694.10 Sociology of Foreign Areas
- 694.11 Rural Church
- 694.12 Farmer Organizations
- 694.13 General Rural Sociology
- 694.14 Rural Social Problems

#### GENERAL PREREQUISITES FOR COURSES NUMBERED 700

Unless otherwise indicated, the prerequisites for 700-level courses are 15 cr. hrs. in courses in the same discipline numbered 400 or higher, plus additional specified course(s) numbered 600 or higher.

#### 796 U G 2-4

##### Seminars in Rural Sociology

A, W, Sp.

Prereq.: 15 cr. hrs. in Rur. Soc. and/or Soc. or permission of instructor.

Each decimal subdivision repeatable to a maximum of 8 cr. hrs.

- 796.01 Human Population Problems
- 796.02 Rural Family
- 796.03 Rural Health
- 796.04 Rural Leadership
- 796.05 Rural Community and Institutions
- 796.06 Community Development
- 796.07 Diffusion of Technology
- 796.08 Research Methods in Rural Sociology
- 796.09 Social Organization and Administrative Problems
- 796.10 Sociology of Foreign Areas
- 796.11 Rural Church
- 796.12 Farmer Organizations
- 796.13 General Rural Sociology
- 796.14 Rural Social Problems

#### GENERAL PREREQUISITES FOR COURSES NUMBERED 800 AND 900

Unless otherwise indicated, the prerequisites for 800 and 900-level courses are 30 cr. hrs. in courses in the same discipline, or 20 cr. hrs. in the same discipline, plus 25 cr. hrs. in specified allied disciplines.

#### 888 G 3

##### Social Action in Community Development

W. Arr.

An analysis of the steps and conceptual areas in the social action process and its application to rural community development. Phillips.

#### 897 G 1

##### Interdepartmental Seminar in Natural Resources

A, W, Sp. Arr.

Repeatable to a maximum of 9 cr. hrs.

(See under Interdepartmental Seminars.)

#### 999 G Arr.

##### Research

Su, A, W, Sp.

Research for thesis and dissertation purposes only.

## Russian

Office: 204 Dieter Cunz Hall of Languages, 1841 Millikin Road

**Professors** Silbajoris (Acting Chairman), Krzyzanowski, Oulanoff, and Twarog; **Adjunct Professor** Grulio; **Associate Professors** Matejic, Naylor, Robinson, and Smith; **Adjunct Associate Professor** Ehlers; **Assistant Professors** Bolen, Daniels, Kolodzieg, and Kragalott.

#### 101 U 5

##### Elementary Russian

Su, A, W, Sp. 5 cl.

#### 102 U 5

##### Elementary Russian

Su, A, W, Sp. 5 cl.

Prereq.: 101.

#### 103 U 5

##### Intermediate Russian

Su, A, W, Sp. 5 cl.

Prereq.: 102.

Reading of prose and poetry; oral and written practice; grammar review.

#### 104 U 5

##### Intermediate Russian

Su, A, W, Sp. 5 cl.

Prereq.: 103 or 112.

107, 108, and 109 may be taken in lieu of 104.

Reading of prose and poetry; oral and written practice; vocabulary building.

**107 U 2****Scientific Russian Reading**

A. 2 cl.

Prereq.: 103 or 112.

107, 108, and 109 may be taken in lieu of 104.

Concentration on material of general interest to all sciences.

**108 U 2****Scientific Russian Reading**

W. 2 cl.

Prereq.: 107 or permission of instructor.

107, 108, and 109 may be taken in lieu of 104.

Reading of unedited texts from current Soviet publications.

**109 U 2****Scientific Russian Reading**

Sp. 2 cl.

Prereq.: 108 or permission of instructor.

107, 108, and 109 may be taken in lieu of 104.

Specialized reading and translation of a major contribution in one of the sciences.

**112 U 5, 10, 15****Intensive Russian**

Su, A. 15 cl.

Full time of student and full fees required.

Prereq.: Permission of chairman.

Students with credit for 101 or the equiv. may not register for more than 10 cr. hrs. Students with credit for 101 and 102 or the equiv. may not register for more than 5 cr. hrs. Students with credit for 103 or the equiv. may not register for credit.

Registration limited. Early enrollment advised.

Elementary and intermediate Russian for students desiring comprehensive knowledge of Russian in the shortest possible time.

**162 U 5****Elementary-Intermediate Russian for Selected Students**

W. 5 cl.

Prereq.: Grade of A in 101.

Not open to students with credit for 130.

**163 U 5****Elementary-Intermediate Russian for Selected Students**

Sp. 5 cl.

Prereq.: 161.

Not open to students with credit for 131.

Successful completion of the sequence 101-162-163 fulfills language requirements and provides eligibility for 400-level courses.

**220 U 5****Russian Literature in English Translation: From Pushkin to Turgenev**

Su, A. 4 cl., 1 hr. arr.

Not open to students with credit for 420.

An introduction to the Russian novel, drama, and poetry; major contributions of Pushkin, Lermontov, Gogol, Ostrovsky, Goncharov, and Turgenev.

**221 U 5****Russian Literature in English Translation: From Dostoevsky to Blok**

W. 4 cl., 1 hr. arr.

Not open to students with credit for 421.

Reading and analysis of Crime and Punishment, War and Peace, The Golovlyov Family, as well as short stories and plays by Chekhov, Gorky, Bunin, Bely, and Andreyev.

**222 U 5****Russian Literature in English Translation: Introduction to Soviet Literature**

Sp. 4 cl., 1 hr. arr.

Not open to students with credit for 522.

A general introduction to Soviet Russian literature from 1917 to the present, in the context of social and political developments in the U.S.S.R.

**405 U 3****Russian Conversation**

A, W, Sp. 3 cl.

Prereq.: 104 or permission of instructor; concur. 406 recommended.

Drill in everyday patterns of conversation.

**406 U 2****Russian Composition**

A, W, Sp. 2 cl.

Prereq.: 104 or permission of instructor; concur. 405 recommended.

Practice in simple writing.

**407 U 3****Intermediate Conversation**

A, W, Sp. 3 cl.

Prereq.: 405 or permission of instructor; concur. 408 recommended.

Drills in intonation; perfection of pronunciation; oral reports; expansion of spoken vocabulary.

**408 U 2****Review Grammar and Composition**

A, W, Sp. 2 cl.

Prereq.: 406 or permission of instructor; concur. 407 recommended.

Review of Russian grammar, composition on assigned topics, practice in translation.

**412 U 5 or 10****Intermediate Intensive Russian**

W. 10 cl.

Prereq.: 103, 112, or permission of chairman.

The equiv. of 104, 405, and 406. Students with credit for 104 may, with permission of chairman, register for 5 cr. hrs. instead of 10 cr. hrs. The course must be taken in its entirety.

**522 U G 5****Russian Literature in English Translation: Soviet Literature**

Sp. 4 cl.

Prereq.: Graduate standing or permission of instructor.

Not open to students with credit for (616) or 622.

A survey of Soviet Russian literature from 1917 to the present; reading of representative authors such as Fadeyev, Leonov, Fedin, Sholokhov, and Pasternak.

**551 U G 5****Introduction to Russian Literature, The Early Classics: Romanticism, The Natural School, and Early Realism**

A. 4 cl.

Prereq.: 407 and 408, or permission of instructor.  
Conducted in Russian.

Not open to students with credit for 475.

Readings from representative authors such as Pushkin, Lermontov, Gogol, and Turgenev. Bolen.

**552 U G 5****Introduction to Russian Literature, The Russian Realists**

W. 4 cl.

Prereq.: 407 and 408, or permission of instructor.  
Conducted in Russian.

Not open to students with credit for 476.

Readings from representative authors such as Turgenev, Dostoevsky, Tolstoy, and Goncharov. Bolen.

**553 U G 5****Introduction to Russian Literature, Impressionism, Critical Realism, Symbolism, and Socialist Realism**

Sp. 4 cl.

Prereq.: 407 and 408, or permission of instructor.  
Conducted in Russian.

Not open to students with credit for 477.

Readings from representative authors such as Chekhov, Gorky, Bunin, Blok, and Sholokhov. Bolen.

**571 G 5****Basic Russian for Graduate Students**

Su (1st term), A, W. 5 cl.

Prereq.: Grad. standing.

Credit does not apply to the minimum hours required for the master's or doctoral degrees.

Basic elements of Russian grammar.

**572 G 5****Russian for Research**

Su (2nd term), W, Sp. 5 cl.

Prereq.: Grade of C or above in 571 or equiv.

Credit does not apply to the minimum hours required for the master's or doctoral degrees.

Repeatable twice.

Satisfactory completion of this course (grade A or B) may be accepted by the student's dept. as evidence of a dictionary reading knowledge in fulfillment of Ph.D. language requirement.

**608 U G 5****Review of Grammar**

A. 4 cl.

Concur.: 513.

Open only to students in the Certificate Program.

Review of grammar with emphasis on those elements of special value to translators of factual material.

**609 U G 4****Advanced Reading, Conversation, and Composition I**

A. 3 cl., 2 hr. arr.

Prereq.: 45 cr. hrs. in Russian or permission of instructor.

Reading of contemporary prose and verse, presentation of oral and written reports, drill in intonation patterns, translation from English into Russian.

**610 U G 4****Advanced Reading, Conversation, and Composition II**

W. 3 cl., 2 hr. arr.

Prereq.: 609 or permission of instructor.

**611 U G 4****Advanced Reading, Conversation, and Composition III**

Sp. 3 cl., 2 hr. arr.

Prereq.: 610 or permission of instructor.

**613 U G 5****Translation Techniques I**

A. 5 cl.

Prereq.: 45 cr. hrs. in Russian or permission of instructor.

Not open to students with credit for 513.

Translation of material from the social sciences; discussion of techniques, procedures, methodology, and the art of translation. Ehlers.

**614 U G 5****Translation Techniques II**

W. 5 cl.

Prereq.: 613 or equiv. or permission of instructor.

Not open to students with credit for 514.

Continuation of 613; work with progressively more difficult passages. Ehlers.

**615 U G 5****Translation Techniques III**

Sp. 5 cl.

Prereq.: 614 or equiv. or permission of instructor.

Translation of modern fiction; comparative and contrastive analysis of problems encountered in translating fiction and factual material. Ehlers.

**630 U G 5****Applied Linguistics for the Russian Major**

A. 3 cl.

Prereq.: 45 cr. hrs. in Russian or permission of instructor.

Introduction to the categories and techniques of applied linguistics, especially phonemic and morphemic analysis; all examples drawn from Russian and English. Daniels.

**635 U G 5****Practical Russian Pronunciation**

W. 3 cl., 2 labs.

Prereq.: 45 cr. hrs. in Russian or permission of instructor.

Lectures and practical exercises; use of phonetic symbols; corrective exercises; problems of teaching pronunciation. Daniels.

**640 U G 5****Contrastive Structures of Russian and English**

Su, Sp. 3 cl.

Prereq.: 45 cr. hrs. in Russian or permission of instructor.

Comparison of the structures of the Russian and English languages stressing practical difficulties in pronunciation and grammar. Robinson.

**GENERAL PREREQUISITES FOR 600 LEVEL COURSES IN LITERATURE**

Nine credit hours in Russian Literature courses 400 level or above.

**645†\* U G 5**

**Survey of Russian Poetry**

W. 3 cl.

Prereq.: 551, 552, and 553, or permission of instructor.

Development of poetry from the 18th century to the present; readings from major periods and movements.

**650†\* U G 5**

**Dostoevsky**

A. 3 cl.

Prereq.: 9 cr. hrs. in literature courses at the 400 level or above.

Given in English but undergraduate majors in Slavic will do prescribed portions of the reading in the original; grad. students in Slavic must read in the original items starred on the departmental M.A. Reading List.

Critical analysis of the major novels and shorter works; intellectual and literary development of Dostoevsky.

**651†\* U G 5**

**Tolstoy**

W. 3 cl.

Prereq.: 9 cr. hrs. in literature courses at the 400 level or above.

Given in English but undergraduate majors in Slavic will do prescribed portions of the reading in the original; grad. students in Slavic must read in the original items starred on the departmental M.A. Reading List.

Analysis of all major works including the novels, plays, stories, and important polemical works.

**652†\* U G 5**

**Turgenev and Chekhov**

Su, Sp. 3 cl.

Prereq.: 9 cr. hrs. in literature courses at the 400 level or above.

Given in English but undergraduate majors in Slavic will do prescribed portions of the reading in the original; grad. students in Slavic must read in the original items starred on the departmental M.A. Reading List.

Critical analysis of the major novels, plays, and short stories of both writers; stylistic similarities and differences.

**653\* U G 5**

**Russian Drama**

A. 3 cl.

Prereq.: 9 cr. hrs. in literature courses at the 400 level or above.

Given in English but undergraduate majors in Slavic will do prescribed portions of the reading in the original; grad. students in Slavic must read in the original items starred on the departmental M.A. Reading List.

Emphasis on the period from 1850 to present day; Ostrovsky, Chekhov, Gorky, Andreyev, Blok, and Soviet writers Leonov and Kataev.

**654\* U G 5**

**Gogol**

W. 3 cl.

Prereq.: 9 cr. hrs. in literature courses at the 400 level or above.

Given in English but undergraduate majors in Slavic will do prescribed portions of the reading in the original; grad. students in Slavic must read in the original items starred on the departmental M.A. Reading List.

Critical analysis of all major works including novels, plays, short stories, and important polemical works.

**655\* U G 5**

**Writers of Satire and Byt**

Sp. 3 cl.

Prereq.: 9 cr. hrs. in literature courses at the 400 level or above.

Given in English but undergraduate majors in Slavic will do prescribed portions of the reading in the original; grad. students in Slavic must read in the original items starred on the departmental M.A. Reading List.

Critical analysis of the major works of Aksakov, Goncharov, Saltykov-Shchedrin, and Leskov.

**693 U G 2-10**

**Individual Studies**

Su, A, W, Sp.

Prereq.: Permission of dept. chairman.

Repeatable to a maximum of 15 cr. hrs.

**693.01 Literature to 1820**

**693.02 Literature 1820-1917**

**693.03 Literature since 1917**

**693.04 Morphology**

**693.05 Phonology**

**693.06 Dialectology**

**693.07 Old Russian**

**693.08 Unspecified**

**694 U G 2-10**

**Group Studies**

Su, A, W, Sp.

Prereq.: Permission of dept. chairman.

Repeatable to a maximum of 15 cr. hrs.

**698 U G 15**

**Study Tour of the USSR**

Sp.

Prereq.: Minimum of 25 hrs. of Russ. or equiv. and permission of dept. chairman.

At The Ohio State University students will be given advanced work in conversation and reading in order to prepare for the tour; in the USSR only Russian will be spoken; some formal instruction will be given daily by the tour leaders. Smith.

**801 G 3**

**College Teaching of Russian I**

A. 3 cl., 2 lab. hrs.

Prereq.: 611 or equiv., or permission of instructor.

Methods and techniques for teaching Russian at the College level; selection and preparation of teaching and testing materials; the language laboratory and other aids. Smith.

**802 G 2**

**College Teaching of Russian II**

W. 2 cl., 1 lab. hr.

Prereq.: 801 or permission of instructor.

Continuation of 801; development of advanced instructional and testing materials; selection of readings and cultural materials; planning undergraduate Russian language programs; research on language teaching. Smith.

**810 G 5**

**Old Church Slavonic**

A. 5 cl.

Study of the earliest recorded Slavic language; reading and linguistic interpretation of original documents.

**812†\* G 5**

**Readings in Old Church Slavonic Texts**

W. 3 cl.

Prereq.: 810 or permission of instructor.

Reading and analysis of Church Slavonic texts of the later period.

**813†\* G 5**

**Readings in Old Russian**

Sp. 3 cl.

Prereq.: 810 or permission of instructor.

Reading and analysis of Old Russian texts.

**820 G 3**

**History of the Russian Language**

W. 3 cl.

A survey of phonetic, morphological, and syntactical changes from the period of Common Slavic to the present; the formation of the Russian literary language.

**823\* G 5**

**Development of the Russian Literary Language**

A. 3 cl.

Prereq.: 820 or permission of instructor.

The formation of Russian as a literary language; the role of Church Slavonic elements in its formation and Western influences on Russian.

**826\* G 5**

**Structure of Russian: Morphology**

W. 3 cl.

Prereq.: 640 or permission of instructor.

Analysis and description of the morphological system of contemporary standard Russian.

**827\* G 5**

**History of Russian: Morphology**

Sp. 3 cl.

Prereq.: 820 or permission of instructor.

Development of Russian morphology from Common Slavic to contemporary Russian with consideration of the place of Russian within East Slavic.

**828†\* G 5**

**Structure of Russian: Phonology**

W. 3 cl.

Prereq.: 640 or permission of instructor.

Description and analysis of the phonological system of contemporary standard Russian.

**829†\* G 5**

**History of Russian: Phonology**

Sp. 3 cl.

Prereq.: 820 or permission of instructor.

Development of Russian phonology from Common Slavic to contemporary standard Russian with consideration of the place of Russian within East Slavic.

**830\* G 5**

**Russian Literature to 1650**

W. 3 cl.

Emphasis on literature of the Kievan period. Silbajoris.

**831†\* G 5**

**Russian Literature 1650-1800**

Sp. 3 cl.

The baroque period, classicism, and sentimentalism; emphasis on the classical period of the 18th century. Silbajoris.

**832†\* G 5**

**History of Russian Literary Criticism I**

A. 3 cl.

Prereq.: 2nd yr. grad. standing or permission of instructor.

From the 17th century to 1890; reading and discussion of Prokopovich, Trediakovsky, Sumarokov, Karamzin, Belinsky, Chernyshevsky, Pisarev, Dobroliubov, Mikhailovsky, Grigor'ev, and Leont'ev.

**833†\* G 5**

**History of Russian Literary Criticism II**

Sp. 3 cl.

Prereq.: 2nd yr. grad. standing or permission of instructor.

From 1890 to the present; decadents, modernists, and symbolists to 1920; Leo Tolstoy; formalism and the sociological method in the 1920's; socialist realism.

**834\* G 5**

**Russian Folklore**

Sp. 3 cl.

Prereq.: 2nd yr. grad. standing or permission of instructor.

From the beginning to present; proverbs, the oral epic, historical songs, folktales, the folk theatre; analysis of the folklore component in modern Russian literature.

**840\* G 5**

**Pushkin and His Time**

A. 3 cl.

Analysis of Eugene Onegin as poetry and an encyclopedia of the times; social, political, and cultural trends in the 1820's and 1830's; romantic Poets. Silbajoris.

**841†\* G 5**

**Russian Poetry to 1890**

W. 3 cl.

Readings from the major poets of the 18th and 19th centuries: Lomonosov, Zhukovsky, Pushkin, Lermontov, Tyutchev, Fet, Nekrasov, Polonsky, and others.

**842† G 5****Russian Poetry from 1890 to Present**

Sp. 3 cl.

Major movements and poets: Blok, Bely, Briusov, Balmont, Mayakovsky, Gumilyov, Akhmatova, Esenin, Pasternak, Tvardovsky, Evtushenko, and others.

**843\* G 5****Russian Poetics and Versification**

Sp. 3 cl.

Prereq.: 645, 841, 842, or permission of instructor.

Development of Russian versification from the byliny to the present; folk meter, syllabic verse, syllabo-tonic versification of the 19th and 20th centuries, tonic verse.

**850 G 3-5****Seminar in Russian Literature to 1820**

A. 2 cl.

**851 G 3-5****Seminar in Russian Literature 1820-1917**

W. 2 cl.

**852 G 3-5****Seminar in Soviet Literature**

Sp. 2 cl.

**993 G 2-10****Individual Studies**

Su, A, W, Sp.

Prereq.: Permission of dept. chairman.

Repeatable to a maximum of 30 cr. hrs. in any combination of decimal subdivisions.

**993.01 Literature to 1820****993.02 Literature 1820-1917****993.03 Literature since 1917****993.04 Morphology****993.05 Phonology****993.06 Dialectology****993.07 Old Russian****993.08 Unspecified****994 G 2-10****Group Studies**

Su, A, W, Sp.

Prereq.: Permission of dept. chairman.

Repeatable to a maximum of 15 cr. hrs.

**Serbo-Croatian**

Office: 204 Dieter Cunz Hall of Languages, 1841 Millikin Road

Associate Professors Naylor and Matejic; Assistant Professor Kragalott.

**601\* U G 4****Serbo-Croatian**

A. 3 cl., 2 hr. arr.

Prereq.: Russ. 103 or 112 or permission of instructor.

**602\* U G 4****Serbo-Croatian**

W. 3 cl., 2 hr. arr.

Prereq.: 601 or permission of instructor.

**603\* U G 4****Serbo-Croatian**

Sp. 3 cl., 2 hr. arr.

Prereq.: 602 or permission of instructor.

**604†\* U G 3****Intermediate Serbo-Croatian**

A. 3 cl.

Prereq.: 603 or equiv.

Reading of simple Serbo-Croatian texts from the 19th century.

**605†\* U G 3****Intermediate Serbo-Croatian**

W. 3 cl.

Prereq.: 604 or permission of instructor.

Reading texts of moderate difficulty, conversation, and simple compositions.

**606†\* U G 3****Intermediate Serbo-Croatian**

Sp. 3 cl.

Prereq.: 605 or permission of instructor.

Reading from modern Serbo-Croatian literature, practice in writing and speaking.

**620†\* U G 5****Serbo-Croatian Literature in English Translation**

A. 3 cl.

Prereq.: 4th yr. standing or grad. standing or permission of instructor.

Grad. students in Slavic may be required to do some reading in Russ. and French or Ger.

From the medieval period to the beginning of the 19th century; religious literature, heroic songs, written epic, the Renaissance, and classicism.

**621†\* U G 5****Serbo-Croatian Literature in English Translation**

W. 3 cl.

Prereq.: 4th yr. standing or grad. standing or permission of instructor.

Grad. students in Slavic may be required to do some reading in Russ. and French or Ger.

Literature of the 19th and 20th centuries; emphasis on Vuk Karadzic, Njegos, and Andric.

**693 U G 2-10****Individual Studies**

Su, A, W, Sp.

Prereq.: Permission of chairman.

Repeatable to a maximum of 20 cr. hrs.

**693.01 Literature to 1850****693.02 Literature, 1850-1918****693.03 Literature since 1918****693.04 Morphology****693.05 Phonology****693.06 Dialectology****693.07 Old Serbian****693.08 Unspecified**

**694 U G 2-10****Group Studies**

A, W, Sp.

Prereq.: Permission of chairman.

Repeatable to a maximum of 15 cr. hrs.

**722†\* U G 5****Contemporary Serbo-Croatian Literature**

Sp. 3 cl.

Prereq.: 605 and 621, or permission of instructor.

Prose and poetry since 1945; emphasis on Andric, Cosic, Lalic, Davico, Erih Kos, Krljeza, and Raickovic.

**821\* G 5****The Structure of Serbo-Croatian**

Sp. 3 cl.

Prereq.: 606 or permission of instructor.

Analysis and description of the phonological and morphological systems of contemporary literary Serbo-Croatian. Naylor.

**993 G 2-10****Individual Studies**

Su, A, W, Sp.

Prereq.: Permission of chairman.

Repeatable to a maximum of 40 cr. hrs. in any combination of decimal subdivisions.

993.01 Literature to 1850

993.02 Literature from 1850-1918

993.03 Literature since 1918

993.04 Morphology

993.05 Phonology

993.06 Dialectology

993.07 Old Serbian

993.08 Unspecified

**994 G 2-10****Group Studies**

A.

Prereq.: Permission of chairman.

Repeatable to a maximum of 15 cr. hrs.

## Slavic Languages and Literatures

Office: 204 Dieter Cunz Hall of Languages, 1841 Millikin Road

Professors Krzyzanowski and Twarog; Associate Professors Naylor and Robinson; Assistant Professor Kragalott.

**219 U 5****Slavic Literature in English Translation from the Beginning to the Present**

Sp. 4 cl., 1 hr. arr.

Not open to students with credit for 519.

Emphasis on masterpieces of non-Russian Slavic literatures; epic tradition, Kochanowski, Comeius, Obradovic, Mickiewicz, Shevchenko, Macha, Sienkiewicz, Reymont, Franko, Ukrainka, Vazov, Capek, Hasek, and Andric.

**230 U 5****Slavic Languages and Cultures**

A. 4 cl.

Taught in Engl.

Historical distribution, contemporary situation, language policies of Slavic nations; interaction of Slavic cultures and their congeners and neighbors; mutual impact of Slavic languages and cultures.

**693 U G 2-10****Individual Studies in Slavic**

Su, A, W, Sp.

Prereq.: Permission of department chairman.

Repeatable to a maximum of 15 cr. hrs.

693.01 Literature, East Slavic

693.02 Literature, South Slavic

693.03 Literature, West Slavic

693.04 Literature, unspecified

693.05 Linguistics, East Slavic

693.06 Linguistics, South Slavic

693.07 Linguistics, West Slavic

693.08 Linguistics, unspecified

693.09 Church Slavonic

693.10 Linguistics, Balto-Slavic

693.11 Unspecified

**694 U G 2-10****Group Studies in Slavic**

Su, A, W, Sp.

Prereq.: Permission of chairman.

Each decimal subdivision repeatable to a maximum of 10 cr. hrs.

694.01 Literature, East Slavic

694.02 Literature, South Slavic

694.03 Literature, West Slavic

694.04 Literature, unspecified

694.05 Linguistics, East Slavic

694.06 Linguistics, South Slavic

694.07 Linguistics, West Slavic

694.08 Linguistics, unspecified

694.09 Church Slavonic

694.10 Linguistics, Balto-Slavic

694.11 Unspecified

**H783 U 3-5****Honors Course**

A, W, Sp.

Prereq.: 4th yr. standing; a grade of A in at least half of the Slavic courses taken and an average of B in the remainder; permission of instructor under whose supervision the work is to be completed and the Arts and Sciences Honors Committee. Failure to receive a mark of S in this course is a disqualification for special honors.

Repeatable to a maximum of 15 cr. hrs.

**794 U G 2-10****Group Studies**

Su, A, W, Sp.

Prereq.: Permission of chairman.

Repeatable to a maximum of 10 cr. hrs.

**800 G 3**  
**Bibliography and Method**

A. 2 cl.

Not open to students with credit for 880.

Required of all candidates for grad. degrees; to acquaint grad. students with the tools, problems, and methods of linguistic and literary research.

**860 G 3**  
**An Introduction to the Slavic Languages**

W. 3 cl.

A general survey of all the Slavic languages and their common features. Robinson.

**861\* G 5**  
**History of South Slavic Languages**

A. 3 cl.

Prereq.: Good command of Russ. and acquaintance with a second Slavic language or permission of instructor.

Bulgarian, Macedonian, Serbo-Croatian, and Slovenian, with emphasis on Serbo-Croatian and its relation to the other South Slavic Languages. Naylor.

**862†\* G 5**  
**History of the West Slavic Languages**

A. 3 cl.

Prereq.: Good command of Russ. and acquaintance with a second Slavic language or permission of instructor.

Polish, Czech, Slovak, Polabian, Kashub, and Sorbian, with special emphasis on Polish and its relation to the other West Slavic languages. Robinson.

**864\* G 5**  
**Comparative Slavic Grammar**

Sp. 3 cl.

Prereq.: 860 or permission of instructor.

Development of Indo-European phonology and morphology into Common Slavic, and the developments in contemporary Slavic languages.

**870 G 3-5**  
**Seminar in Slavic Philology**

A. 2 cl.

Historical and comparative studies in the Slavic languages and related language families, including Baltic and Finno-Ugric.

**871 G 3-5**  
**Seminar in Slavic Linguistics**

Su, Sp. 2 cl.

Descriptive and transformational studies in Russian and the other Slavic languages.

**875 G 3-5**  
**Seminar in Slavic Literature**

A. 2 cl.

Selected topics from medieval and modern literature.

**Medieval and Renaissance Culture**  
(See Medieval and Renaissance Studies 888.)**Medieval and Renaissance Literature**  
(See Medieval and Renaissance Studies 889.)**993 G 2-10**  
**Individual Studies**

Su, A, W, Sp.

Prereq.: Permission of chairman.

Repeatable to a maximum of 40 cr. hrs. in any combination of decimal subdivisions.

- 993.01 Literature, East Slavic
- 993.02 Literature, South Slavic
- 993.03 Literature, West Slavic
- 993.04 Literature, unspecified
- 993.05 Linguistics, East Slavic
- 993.06 Linguistics, South Slavic
- 993.07 Linguistics, West Slavic
- 993.08 Linguistics, unspecified
- 993.09 Church Slavonic
- 993.10 Linguistics, Balto-Slavic
- 993.11 Unspecified

**994 G 2-10**  
**Group Studies**

Su, A, W, Sp.

Prereq.: Permission of dept. chairman.

Repeatable to a maximum of 10 cr. hrs.

- 994.01 Literature, East Slavic
- 994.02 Literature, South Slavic
- 994.03 Literature, West Slavic
- 994.04 Literature, unspecified
- 994.05 Linguistics, East Slavic
- 994.06 Linguistics, South Slavic
- 994.07 Linguistics, West Slavic
- 994.08 Linguistics, unspecified
- 994.09 Church Slavonic
- 994.10 Linguistics, Balto-Slavic
- 994.11 Unspecified

**999 G Arr.**  
**Research in Slavic**

Su, A, W, Sp.

Research for thesis purposes only.

**Social Work**

Office: 300 Stillman Hall, 1947 College Road

**Professors** Medhurst (Director), Batchelor (Emeritus), Cornell, Hoffer (Visiting), Livingston, Mark (Emeritus), Nichols (Emeritus), Parnicky, Rosner, L. Schneiderman, and Shimp (Emeritus); **Associate Professors**, Allen (Adjunct), Bailey, Behling, Bendekovic, Billups, Blackburn (Emeritus), D'Angelo, Daykin, Decker, Dixon, Hamilton, Longo, McMillin, Pillow, Ross, Ryan, H. Schneiderman, and Sze; **Assistant Professors** Ain, Blumenstein, Curtis, Foster, Gilbert, Good, Gregory, Hopps, Jones, Keller, Pantalos, Price, Rindfleisch, Schildhouse (Visiting), and Van der Does; **Instructors** Bussell and Dutton.

**323 U 4**  
**Problems, Policies, and Programs in Social Welfare I**

W, Sp. 2 2-hr. cl.

Prereq.: Social Welfare major; non-majors with permission only.

An introduction to the values, value conflicts, and major goals in the American social welfare system.



**325 U 4****Problems, Policies, and Programs in Social Welfare II**

A, W, Sp. 2 2-hr. cl.

Prereq.: 323; Social Welfare major; non-majors with permission only.

Examination of the interrelationships among various social problems, social welfare programs, policy issues, and the role of social work in terms of the American social welfare system.

**380 U 5****Introduction to Research Methods in Social Work**

A, W, Sp. 3 cl., 1 2-hr. lab.

Prereq.: Stat. 125 or equiv.

Science and society; research design; measuring variables; data collection, processing and analysis; participation in a research project is required.

**414 U 2****Introduction to Field Practice**

W, Sp. 2-hr. seminar.

Prereq.: Social Welfare major and permission of the B.S. in Social Welfare Program Coordinator.

Small group seminar designed to prepare students for a subsequent one-quarter practicum in a social welfare organization; focus on field trips, class discussion.

**415 U 1-15****Field Practice**

Su, Sp. Social agency assignments.

Prereq.: Social Welfare major, 414, and permission of the B.S. in Social Welfare Program Coordinator.

Placement in a social welfare organization used by the school as a teaching center; student expected to assume service provision role in a progressively responsible manner.

**431 U 4****Determinants of Social Functioning I**

A, W. 2 2-hr. cl.

Prereq.: Social Welfare major; non-majors with permission only.

Introduction to individual, group, organizational, and community determinants of social functioning with attention to stress and sub-cultural processes and conditions.

**432 U 3****Determinants of Social Functioning II**

W, Sp. 2 1½-hr. cl.

Prereq.: 431, Social Welfare major; non-majors with permission only.

Introduction to the basic determinants of individual and family social functioning, using a life cycle approach from marriage through children's latency.

**433 U 3****Determinants of Social Functioning III**

A, W, Sp. 2 1½-hr. cl.

Prereq.: 432, Social Welfare major; non-majors with permission only.

Introduction to the basic determinants of individual and family functioning, using a life cycle approach, from children's latency through aging years of parents.

**443 U 3****Social Work Practice I**

A, W. 2 1½-hr. cl.

Prereq.: Social Welfare major; non-majors with permission only.

The structure of social work, its dimensions, parameters, and functions.

**445 U 3****Social Work Practice II**

W, Sp. 2 1½-hr. cl.

Prereq.: 443, Social Welfare major; non-majors with permission only.

Social worker roles, activities, and responsibilities.

**447 U 3****Social Work Practice III**

A, W, Sp. 2 1½-hr. cl.

Prereq.: 445, Social Welfare major; non-majors with permission only.

Development of a conceptual framework for social work practice.

**503 U G 5****Juvenile Delinquency: Its Treatment and Prevention**

A, W, Sp. 2 2½-hr. cl.

Prereq.: 3rd or 4th year standing.

Juvenile delinquency as a social problem; methods of treatment and prevention, including juvenile courts, clinics, probation, parole, correctional institutions, child placement, and recreational programs.

**505 U G 3****Social Implications in Rehabilitation**

A, Sp. 3 cl.

Prereq.: 3rd or 4th yr. standing or permission of instructor.

Not for grad. credit to students in Soc. Work.

The significance of disability and employment in their social, medical, and industrial application; rehabilitation as a process; current concepts.

**507 U G 3****Social Work and Health Services**

W. 3 cl.

Prereq.: 4th yr. standing or permission of instructor.

The nature, organization, and function of programs, facilities in the health practice field; the social and economic implication of chronic disease.

**509 U G 3****Legal Aspects of Social Work**

A, W, Sp. 3 cl.

Prereq.: 3rd or 4th yr. standing or permission of instructor.

Not for grad. credit to students in Soc. Work.

Law as a means of social control; study of case, statute, and constitutional law most frequently involved in social work practice; legal aid.

**593 U 1-5****Individual Studies**

Su, A, W, Sp.

Prereq.: 12 cr. hrs. in Social Work courses, approval of instructor, and review by sequence chairman.

Repeatable to a maximum of 10 cr. hrs.

Individual study projects on problems and services in selected areas of social welfare; report required.

**594 U 1-5****Group Studies**

Su, A, W, Sp.

Prereq.: 12 cr. hrs. in Social Work courses, approval of instructor, and review by sequence chairman.

Repeatable to a maximum of 10 cr. hrs.

Group study projects on problems and services in selected areas of social welfare; report required.

**615 P G 3-8****Field Practice I**

A, W, Sp.

Prereq.: Soc. Work 1st yr. grad. standing.

Arranged by the student's faculty adviser.

Repeatable to a maximum of 18 cr. hrs.

Planned visits to social agencies, group analysis of observation, followed by assignment to specific agency for beginning responsibilities with recipients of agency service.

**620 P G 4****Social Welfare Policies and Programs I**

A. 2 2-hr. cl.

Historical and comparative analysis of social welfare systems; their relationship to change in the basic social institutions of family, church, government, and economic institutions.

**621 P G 4****Social Welfare Policies and Programs II**

W. 2 2-hr. cl.

Prereq.: 620 or equiv.

The development of a conceptual model for social welfare policy and program analysis.

**631 P G 4****Dynamics of Social Functioning I**

A. 2 2-hr. cl.

Prereq.: Grad. standing and permission of instructor.

Dynamics of social functioning examined at the individual, group, and community levels of analysis, with attention to stress, subcultural, and socio-economic processes and conditions.

**632 P G 3****Dynamics of Social Functioning II**

W. 2 1½-hr. cl.

Prereq.: 631 or permission of instructor.

Dynamics of individual and family social functioning as typically experienced and as occurs in response to stress, from conception through latency.

**633 P G 3****Dynamics of Social Functioning III**

Sp. 2 1½-hr. cl.

Prereq.: 632 or permission of instructor.

Dynamics of individual and family social functioning as typically experienced and as occurs in response to stress, from adolescence through aging years of parents.

**641 P G 3****Social Work Practice Theory I**

A. 2 1½-hr. cl.

Prereq.: Soc. Work grad. standing; concur. 615.

Fundamentals of social work practice; practice components, interactional processes, units of attention, and framework of practice.

**642 P G 3****Social Work Practice Theory II**

W. 2 1½-hr. cl.

Prereq.: Soc. Work grad. standing and 641; concur. 615.

Strategies for intervention: differential modes of practice to affect functioning and development of individuals and groups.

**643 P G 3****Social Work Practice Theory III**

Sp. 2 1½-hr. cl.

Prereq.: Soc. Work grad. standing and 642; concur. 615.

Analysis of practice concepts: formulation and operationalization of conceptual hypotheses.

**680 P G 3-6****Research Methods in Social Work**

W, Sp. 1 2-hr. cl., 1 lab.

Prereq.: Soc. Work grad. standing, 380 or equiv.

Formulating researchable questions and hypothetical answers for testing, measurement, research design, data collection and processing, statistical analysis, and reporting results.

**698 U G 1-15****Student Study Tour**

Su, A, W, Sp.

**703 P G 2****Seminars in Social Welfare Policy and Program Analysis**

A, W, Sp. 1 2-hr. cl.

Prereq.: 621 or equiv. and permission of instructor.

Repeatable to a maximum of 8 cr. hrs.

- a. Aging
- b. Family Planning
- c. Health Care
- d. Housing and Urban Development
- e. Income Maintenance
- f. International Social Welfare
- g. Mental Retardation
- h. Other

**715 P G 6-15****Field Practice II**

Su, A, W, Sp.

Prereq.: Soc. Work 2nd yr. grad. standing and 615 or equiv.

Repeatable to maximum of 26 cr. hrs.

Application of social work theory in selected social agency settings; joint direction and evaluation by agency staff and faculty.

**730 P G 3-5****Seminars in Social Functioning**

A, W, Sp. 2 1½-hr. cl.

Prereq.: Soc. Work grad. standing, 633 or equiv.

Repeatable to a maximum of 9 cr. hrs.

Presentation and critical examination of personality, interactional, small group, organizational and community concepts and approaches used in analyzing social dysfunctioning.

**732 P G 3****Seminars in Application of Personality Theory to Social Work Practice**

Sp. 1 3-hr. cl.

Prereq.: Soc. Wk. grad. standing and 633 or equiv.

Assessment of the utility and applicability of personality theories to social work practice.

**741 P G 3-9****Seminars in Clinical Aspects of Social Work Practice**

A, W, Sp. 2 1½-hr. cl.

Prereq.: Soc. Work grad. standing and 643.

Repeatable to a maximum of 9 cr. hrs.

Concepts and strategies for enhancing social functioning and human realization of individuals, families, and groups; subjects ranging from clinical practice formulations through treatment milieus.

**742 P G 3-9****Seminars in Administrative Aspects of Social Work Practice**

A, W, Sp. 2 1½-hr. cl.

Prereq.: Soc. Work grad. standing and 643.

Repeatable to a maximum of 9 cr. hrs.

Concepts and strategies for transforming organizational resources into effective delivery of services; topics include administrative, supervisory, consultative, and inter-organizational practitioner roles.

**743 P G 3-9****Seminars in Social Change Aspects of Social Work Practice**

A, W, Sp. 2 1½-hr. cl.

Prereq.: Soc. Work grad. standing and 643.

Repeatable to a maximum of 9 cr. hrs.

Concepts and strategies for affecting institutional functioning and development at local, regional, national, or international levels; subjects range from community development formulations through social planning and deployment of resources to political and para-political activities.

**746 P G 3****Seminar in Social Work Practice Issues**

Sp. 1 cl.

Prereq.: Soc. Work grad. standing and 643.

Identification, critical examination, and development of a point of view concerning selected issues arising in or impinging upon social work.

**785 P G 1-6****Seminar in Social Work Research Critique**

A, W, Sp. 1 cl.

Prereq.: Soc. Work grad. standing, 680 or equiv.

Repeatable to a maximum of 6 cr. hrs.

Evaluation of selected research reports with reference to their relevance to social work and soundness of methodology; written and oral presentation required.

**786 P G 1-6****Group Research Project**

A, W, Sp.

Prereq.: Soc. Work grad. standing, 680 or equiv.

Repeatable to a maximum of 6 cr. hrs.

Student and faculty participation in the development of a research project at the School or a teaching center; jointly authored research report required.

**787 P G 3****Seminar on the Application of Experimental Designs to Social Work Research**

Sp. 1 3-hr. cl.

Prereq.: 680 or equiv.

Evaluating the plausibility of findings from research using experimental designs as compared with the plausibility of findings from other designs when an experimental design was not feasible.

**788 U P G 2-5****Seminar on Mental Retardation: Interdisciplinary Aspects**

Su, A, W, Sp. Seminars—50%; Family Contact—50%.

Prereq.: Permission of instructor.

An interdisciplinary approach to mental retardation.

**793 P G 1-5****Individual Studies**

Su, A, W, Sp.

Prereq.: Soc. Work grad. standing, permission of instructor, and review by sequence chairman.

Repeatable to a maximum of 15 cr. hrs.

Directed readings and tutorials related to specific problems in the following areas.

- Social Work Practice.
- Social Work Methods.
- Social Welfare Policy and Programs.
- Social Functioning.
- Research.
- Other.

**794 P G 1-4****Group Studies**

A, W, Sp.

Prereq.: Soc. Work 2nd yr. grad. standing, approval of instructor, and review by sequence chairman.

Repeatable to a maximum of 15 cr. hrs.

Group seminars in areas of curriculum as follows:

- Social Work Practice.
- Social Work Methods.
- Social Welfare Policy and Programs.
- Social Functioning.
- Research.
- Other.

**797 P G 2-5****Interdisciplinary Seminars in Family-Social Medicine**

Prereq.: Permission of instructor.

Limited to 30 students.

Students assigned in interdisciplinary pairs or groups to families with complex medical/social problems with resource faculty.

**802 G 3****Seminar in Social Work Education**

Sp. 3 cl.

Prereq.: M.S.W. or permission of instructor.

Development of social work education in North America; problems and issues in curriculum building, teaching methods, and class and field instruction.

**820 G 3-5****Seminar in Social Welfare Policies and Programs I**

A. 3 cl.

Prereq.: M.S.W. or permission of instructor.

Historical view of policy formation as influenced by political, economic, and social conditions; analysis and evaluation of processes involved in major developments.

**821 G 3-5****Seminar in Social Welfare Policies and Programs II**

W. 2 cl.

Prereq.: 820 or permission of instructor.

Analysis of demographic, political, economic, and other influences upon social policy planning; evaluation of policy planning effectiveness.

**822 G 3-5****Seminar in Social Welfare Policies and Programs III**

Sp. 3 cl.

Prereq.: 821 or permission of instructor.

Critical analysis of selected current issues in social policy such as population control, income maintenance, federal, state, and local role in comprehensive social service programs.

**830 G 3-5****Seminar in Social Functioning I**

W. 3 cl.

Prereq.: M.S.W. or permission of instructor.

Critical examination of selected biological, psychological, and social determinants of social functioning and dyadic, small group, organizational, and community levels of analysis.

**831 G 3-5****Seminar in Social Functioning II**

Sp. 3 cl.

Prereq.: 830 or permission of instructor.

Problems in knowledge selection and conceptualization as related to social work practice and the biological, behavioral, and social sciences.

**840 G 3-5****Seminar in Social Work Practice I**

W. 3 cl.

Prereq.: M.S.W. or permission of instructor.

Examination of the nature of social work practice; critical analysis of the underlying assumptions and theoretical base of social work methods.

**841 G 3-5****Seminar in Social Work Practice II**

Sp. 3 cl.

Prereq.: 840 or permission of instructor.

Comparative analysis of social work methods; selected problems and issues.

**880 G 3-5****Seminar in Social Work Research I**

A.

Prereq.: Soc. Work grad. standing, 680, or equiv., and permission of instructor.

Advanced research design and analysis appropriate for testing hypotheses relevant to social welfare knowledge.

**881 G 3-5****Seminar in Social Work Research II**

W.

Prereq.: Soc. Work grad. standing, 880 or equiv., and permission of instructor.

Evaluation of selected research reports with reference to their relevance to social welfare and soundness of methodology.

**882 G 3-5****Seminar in Social Work Research III**

W.

Prereq.: Soc. Work grad. standing, 881 or equiv., and permission of instructor.

Planning research designs and feasible administrative procedures for testing hypotheses relevant to social welfare knowledge.

**899 G 1-5****Interdepartmental Seminar**

Su, A, W, Sp.

(See under Interdepartmental Seminars.)

**993 G 1-3****Individual Studies**

Su, A, W, Sp.

Prereq.: M.S.W. or permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Directed readings and tutorials related to specific problems and issues in following areas:

- a. Social Work Practice.
- b. Social Welfare Policy.
- c. Dynamics of Social Functioning.
- d. Social Work Research
- e. Social Work Education.
- f. Other.

**994 G 2-4****Group Studies**

Su, A, W, Sp.

Prereq.: M.S.W. or equiv.

Repeatable to a maximum of 20 cr. hrs., not more than 10 of which shall be in any one of the following areas.

- a. Social Work Practice.
- b. Social Welfare Policy.
- c. Dynamics of Social Functioning.
- d. Other.

**998 G Arr.****Research in Social Work: Thesis**

Su, A, W, Sp.

Research for thesis purposes only.

**999 G Arr.****Research in Social Work: Dissertation**

Su, A, W, Sp.

Research for dissertation purposes only.

## Sociology

Office: 112 Hagerty Hall, 1775 College Road

**Professors** McDonagh (Chairman), Berry (Emeritus), Bullock, Clarke, Corwin, Cuber, Dinitz, Dynes, Helfrich, R. Hinkle, Jonassen, Mangus (Emeritus), Nagi, Oyler (Emeritus), Petersen, Quarantelli, Reckless (Emeritus), Schwirian, Sletto, H. Y. Tien, and VanderZanden; **Adjunct Professors** Conrad and Folkman; **Associate Professors** Franklin, Nissen (Emeritus), and Li; **Assistant Professors** Clatworthy, Curry, Jiobu, Kerr, Scott, Seidler, and Walum; **Instructors** Aveni and Himmelfarb; **Lecturers** G. Hinkle and C. Tien.

### 101 U 5 Introductory Sociology

Su, A, W, Sp. 5 cl.

Not open to students with credit for 201 or equiv. or Rur. Soc. 105 or equiv.

Fundamental concepts of sociology and an introduction to the analysis of social problems. Cuber and Staff.

### 201 U 5 Fundamentals of Sociology

A, W, Sp. 5 cl.

Not open to students with credit for 101 or equiv.

Nature of society and the factors affecting its development, culture, personality; groups and institutions; selected social problems. Vander Zanden and Staff.

### 202 U 5 Social Trends and Problems

Su, A, W, Sp. 5 cl.

Prereq.: 101 or 201.

Analysis of recent social trends and contemporary social problems. Dinitz and Staff.

### 206 U 3 Social Implications of Low Income

Sp. 3 cl.

Prereq.: 5 cr. hrs. in Soc. or equiv. with permission of instructor.

A study of low-income peoples, especially concerning the effect of low-income on them, and their consequent social participation. Clatworthy.

### 208 U 3 Contemporary Social Criticism

W. 3 cl.

Prereq.: 101 or 201 or equiv.

A critical analysis of intellectual controversies and issues underlying a variety of contemporary movements and ideologies.

### 220 U 4 Sociology of Education

Su, A, Sp. 4 cl.

Prereq.: 5 cr. hrs. in Soc.

Current social trends as they affect education; backgrounds of school children, social status of teachers, role of power and bureaucracy. Corwin and Himmelfarb.

### 250 U 5 Types of Sociological Inquiry

A, W, Sp. 3 cl., 2 2-hr. lab.

Prereq.: 5 cr. hrs. in Soc. or equiv. with permission of instructor.

Introduction to sociological research techniques, methodological approaches, and relevant quantitative procedures. Aveni, Bullock, Himmelfarb, Li, Kerr, and C. Tien.

### 280 U 4 American Minority Relations

A, Sp. 4 cl.

Prereq.: 101 or equiv., and permission of instructor.

Not open to students with credit for 408 or equiv.

Survey of the attitudes and relationships arising from the contacts of various racial and ethnic groups in the United States. VanderZanden.

### 294 U 3-5 Group Studies

A.

Prereq.: 101.

Repeatable to a maximum of 10 cr. hrs.

Topics vary each quarter offered.

### 330 U 3 Varieties of Modern Marriage

Su, A, W, Sp. 3 cl.

Examination of sociological and social-psychological research describing and interpreting emerging pluralistic patterns of man-woman and parent-child relationships. Cuber and Clatworthy.

### 405 U 5 Collective Behavior and Social Movements

A, Sp. 5 cl.

Prereq.: 5 cr. hrs. in Soc. or equiv. and permission of instructor.

Examination of the dynamic social processes characteristic of mass societies through an analysis of crowds, mobs, cults, publics, and the initial stages of social movements. Aveni and Quarantelli.

### 407 U 5 Social Change

A, W. 5 cl.

Prereq.: 5 cr. hrs. in Soc. or equiv. with permission of instructor.

Not open to students with credit for 207.

Recent social changes, especially in Western civilization and the United States; types of societies in historical perspective; requirements of a good society. Aveni.

### 410 U 5 Criminology

Su (1st term), A, W, Sp. 5 cl.

Prereq.: 202.

The nature, variation, and causes of crime and delinquency; studies of criminal liability, criminal careers, and organized racketeering. Dinitz, Friday, and Scott.

### 430 U 4 Sociology of the Family

A, Sp. 4 cl.

Analysis of relationships between the family and the larger society including mate selection, status of women, and patterns of husband-wife and parent-child relationships. Clarke and Cuber.

**434 U 4**  
**The Child and Society**

W. 4 cl.

Prereq.: 101 or 201.

A study of the ways in which society socializes children; current breakdown in the socializing processes and implications for the school and other educational agencies. Clarke and G. Hinkle.

**435 U 5**  
**Sociology of Women**

Sp. 5 cl.

Prereq.: 10 cr. hrs. in Soc.

Analysis of sex-roles and social structure with emphasis on modern social movements concerned with redefining sex-role relationships. Walum.

**462 U 3**  
**Sociology of Organizations**

W. 3 cl.

Prereq.: 10 cr. hrs. in Soc. or permission of instructor.

Functioning of large complex social groupings; goals, structures, coordination, dispersion, survival, change as seen in various organizations: e.g.—governmental, educational, religious, business, and occupational organizations. Corwin and Kerr.

**463 U 4**  
**Social Stratification**

Su (1st term), A, W, Sp. 4 cl.

Prereq.: 101 or 201, and 250.

Class distinction as a phase of social differentiation; origin and characteristics of social class; significance for modern society of class consciousness, class struggle, and social mobility. Kerr, Dynes, and McDonagh.

**464 U 3**  
**Human Relationships in Industry**

W, Sp. 3 cl.

Social processes and problems associated with contemporary industry including growth of formal and informal organizational structure, communication processes, attitude problems, and morale. Helfrich.

**465 U 4**  
**Work and Leisure in Mass Society**

Sp. 4 cl.

An analysis of current relationships between work and leisure, emphasizing social implications of increased leisure time and changing conceptions of work and leisure. Clarke.

**467 U 3**  
**Religious Institutions in Modern Society**

W, Sp. 3 cl.

Prereq.: 101 or 201.

The social role of religious institutions and beliefs, with particular reference to the United States; the relation between religion and other aspects of society. Dynes and Seidler.

**470 U 5**  
**Social Factors in Personality**

W, Sp. 5 cl.

Prereq.: 101 or 201, and 250.

Analysis of relationships between social structure and personality; language; its consequences for social behavior; socialization: learning of motives and social roles; personality: development, organization, and disorganization. Franklin and G. Hinkle.

**480 U 3**  
**Comparative Race Relations**

A, W, 3 cl.

Prereq.: Junior standing and 101.

Analysis of variations in patterns of race relations in diverse institutional settings with particular emphasis on Brazil, South Africa, and the United States. VanderZanden.

**488 U 5**  
**Development of Sociological Thought**

A, W, Sp. 5 cl.

Prereq.: 15 cr. hrs. in Soc.

A survey of major concerns and conceptions in sociology in relation to their social-historical setting from 1800 to the present time. Walum, Hinkle, and Seidler.

**490 U 5**  
**The Sociology of Urban Life**

A, Sp. 4 cl., 1 2-hr. lab.

Prereq.: 10 cr. hrs. in Soc.

Not open to students with credit for 290.

The place of the city in social organization; the emergence, nature, and problems of modern urbanism; projects based on census and field data. Jonassen, Schwirian, and Jiobu.

**503 U G 5**  
**Contemporary Soviet Society**

Sp. 5 cl.

Prereq.: 10 cr. hrs. in Soc. and 15 cr. hrs. in other social sciences, or permission of instructor.

Not open to students with credit for 403.

Organization, development, and problems of the Communist Party, the collective farm, the school, professional occupations, economic planning, and other contemporary Soviet institutions.

**Culture Patterns and Personality**  
(See Anthro. 520.)

**545 U G 5**  
**American Society**

W. 5 cl.

H545 (honors) may be available to students enrolled in a College Honors Program or by permission of dept.

Prereq.: Junior standing with a cumulative point-hour ratio of at least 3.0.

An exposition of the structural patterns of American society, using sociological theories and data but integrating them into a general view. Li and Walum.

**550 U G 3**  
**Introductory Human Population**

W. 3 cl.

Prereq.: 15 cr. hrs. in Soc. or grad. standing.

A general, mainly non-technical, introduction to population studies; the social determinants and consequences of fertility, mortality, and migration. Li and Tien.

**551 U G 3**  
**Intermediate Human Population**

Sp. 3 cl.  
Prereq.: 550.  
A continuation of 550. Schwirian.

**560 U G 5**  
**Comparative Social Organizations**

A. 4 cl.  
A comparative analysis of organizational characteristics and functioning in different cultural settings. Dynes.

**590 U G 5**  
**The Community**

W. 4 cl.  
Prereq.: 10 cr. hrs. in Soc.  
Development of the modern community; approaches to the study of communities; significance of processes and value systems for community organization and disorganization. Jiobu, Jonassen, and Schwirian.

**592 U G 5**  
**The School and the Community**

W. 3 cl.  
Not open to students with credit for 492.  
The school as a social institution in the American community; the sociological importance of community structures, processes and problems in determining school-community relationships. Himmelfarb.

**601 U G 5**  
**Comparative Family Organization**

W. 4 cl.  
Prereq.: Junior standing and 101.  
Not open to students with credit for 432.  
Analysis of family organizations in various societies, emphasizing the impact of changing world conditions on family and kinship structures. Clarke and Cuber.

**608 U G 5**  
**Sociological Aspects of Mass Communication**

W. 5 cl.  
Prereq.: 20 cr. hrs. in Soc. or related fields.  
Examination of structure and functions of mass communication systems in contemporary mass societies, including the relationship between mass media organizations and other institutions.

**610 U G 5**  
**Sociology of Deviant Behavior**

Sp. 5 cl.  
Prereq.: 410 and 488.  
An examination of the nature, types, and societal reactions to deviant behavior; special emphasis on the process of stigmatization and the emergence of deviant subcultures. Dinitz and Scott.

**611 U G 5**  
**Penology**

A, Sp. 5 cl.  
Prereq.: 610 and senior standing.  
Not open to students with credit for 411.

The treatment of adult offenders in detention and incarcerations; short and long term institutions; field trips required. Scott.

**612 U G 5**  
**The Sociology of Economic Life**

A. 3 cl., 2 hrs. arr.  
Study of the relationship between economic and noneconomic aspects of life; theory will be supplemented by related research. Helfrich.

**615 U G 5**  
**Control and Prevention of Crime and Delinquency**

A. 1 2-hr. cl. One field project.  
Prereq.: 610 and senior standing.  
Analysis of the operational effectiveness of special measures and programs pointed toward the control and prevention of crime and delinquency. Dinitz.

**623 U G 5**  
**Advanced Sociology of Education**

W. 5 cl.  
Not open to students with credit for 523.  
Comparisons of the structures and functions of educational systems, elementary through university; recruitment and allocation of personnel and resources, power, conflict, and boundary maintenance. Corwin.

**650 U G 5**  
**Introduction to Quantitative Research Techniques in Sociology**

A, W. 5 cl.  
An introduction to the analysis of sociological data; measurement theory and techniques of interpretation; sampling procedures in sociological research and implications for inference and generalization. Li, Schwirian, Sletto, and C. Tien.

**651 U G 5**  
**Approaches to Sociological Inquiry**

A, W. 3 cl., project.  
Theory and practice in essentials of the research process; comparison of alternative approaches and design models; questionnaire construction, interview techniques, and related problems. Bullock and Li.

**666 U G 5**  
**Political Sociology**

Sp. 3 cl.  
Examination of structural and cultural factors as related to the nature of political systems; consideration of the organization and roles of political and para-political groups.

**693 U G 1-5**  
**Individual Studies**

Su, A, W, Sp.  
Prereq.: Sociol. majors and permission of instructor.  
Repeatable to a maximum of 15 cr. hrs. for each decimal subdivision.

- 693.01 Sociological Theory
- 693.02 Social Organization and Planning
- 693.03 Medical Sociology
- 693.04 Criminology and Penology
- 693.05 Sociology of Education
- 693.06 Race Relations

- 693.07 Social Psychology  
 693.08 The Family  
 693.09 Research Methodology  
 693.10 Urban Sociology  
 693.11 Undergraduate Seminar on Contemporary Sociological Issues  
 693.12 Unclassified  
 693.13 Population

**694 U G 3-5****Group Studies**

A, W, Sp.

Repeatable to a maximum of 15 cr. hrs. for each decimal subdivision.

Topics vary each quarter offered.

- 694.01 Sociological Theory  
 694.02 Social Organization  
 694.03 Medical Sociology  
 694.04 Criminology and Penology  
 694.05 Sociology of Education  
 694.06 Race Relations  
 694.07 Social Psychology  
 694.08 The Family  
 694.09 Research Methodology  
 694.10 Urban Sociology  
 694.11 Contemporary Sociological Issues  
 694.12 Unclassified  
 694.13 Population

**695 U G 5****Seminar in Sociological Perspectives on Modern Education**

A. 3 cl.

Repeatable to a maximum of 9 cr. hrs.

A seminar involving survey and analysis of sociological literature and research regarding the structure, function, personnel and performance of the educational institution in modern society.

**GENERAL PREREQUISITES FOR COURSES NUMBERED 700**

Unless otherwise indicated, the prerequisites for 700-level courses are 30 qtr. hrs. in the same discipline numbered 400 or higher of which 15 hrs. must be at the 600 level.

**Introduction to National Security**

(See Nat. Sec. Pol. S. 702.)

**704 U G 5****Problems in the Design of Sociological Research**

A, W, Sp. 3 cl., project.

Prereq.: 250 or equiv.

Repeatable to a maximum of 10 cr. hrs.

Bullock.

**705 U G 5****Construction and Verification of Theory**

A. 3 cl., project.

Prereq.: 250 or equiv.

Not open to students with credit for 704.01.

Repeatable to a maximum of 10 cr. hrs.

The actual practice of theory construction and its underlying logic. Bullock.

**706 U G 5****Experimental Research Methods**

W. 3 cl., project.

Prereq.: 250 or equiv.

Not open to students with credit for 704.02.

Repeatable to a maximum of 10 cr. hrs.

Survey and analysis of research designs and statistical techniques permitting control and/or assessment of error variance in sociological research by experimental method. Bullock.

**707 U G 5****Problems in Quantitative Analysis**

Sp. 5 cl.

Prereq.: 250 or equiv.

Not open to students with credit for 704.03.

Repeatable to a maximum of 10 cr. hrs.

A survey of advanced problems in the multivariate analysis of sociological data; topics covered include elaboration and specification, causal inference in nonexperimental research and path analysis. Schwirian and Bullock.

**708 U G 5****Problems in Qualitative Analysis**

Sp. 5 cl.

Problems and techniques of non-quantitative data analysis including case studies, participant observation, field diary, autobiography, and historical records. Dynes and Quarantelli.

**730 U G 5****Medical Sociology**

W. 5 cl.

Prereq.: 25 cr. hrs. in Soc. or permission of instructor.

Not open to students with credit for 440.

Sociological analysis of health and illness behavior, the social ecology of illness, health organization, and the health professions. Kerr.

**751 U G 4****Introduction to Human Population Studies**

A. 4 cl.

Not open to students with credit for 550 or equiv.

A more intensive introduction to demography parallel to 550-551; mainly for graduate students in Sociology who lack undergraduate training in the field and want to continue in it.

**752 U G 5****Principles and Techniques of Scale Construction**

W. 3 cl., project.

Prereq.: 650 or equiv. or Soc. Work 540.

Approaches and techniques in the development and testing of social measurement instruments. Bullock and Sletto.

**753 U G 4****General Human Population Studies**

W. 4 cl.

Prereq.: 551 or 751.

A continuation of 751 with an introduction to migration analysis and historical demography; more intensive study of basic population processes.



**754 U G 5**

**Demographic Analysis**

W. 5 cl.

Prereq.: 1 course in general statistics.

Not open to students with credit for 619.

An exposition of census data and vital statistics, demographic rates, life tables, cohort analysis, and similar elementary techniques and data sources in demography. Li and Y. Tien.

**755 U G 4**

**The Social Context of Human Fertility**

A. 4 cl.

Prereq. or concur.: 551 or 751, and 754, or equiv.

A critical and methodological analysis of fertility, with special emphasis on the social context of reproductive behavior in American society. Y. Tien.

**756 U G 4**

**Internal Human Migration**

A. 3 cl., 1 lab. hr.

Prereq. or concur.: 551 or 751, and 754, or equiv.

Theories and models of internal migration, based on data in various types of societies.

**770 U G 5**

**Individual in Society**

W. 5 cl.

Analysis and synthesis of the major theories and findings of social psychology. Franklin and G. Hinkle.

**772 U G 5**

**Small Groups**

A. 5 cl.

Not open to students with credit for 661.

Analysis of group structure and processes; examination of roles, interpersonal structure, leadership; observation of groups in laboratory and non-laboratory settings. Curry.

**780 U G 5**

**Racial and Ethnic Differentiation**

A. 3 cl.

An analysis of the origin, persistence, adaptation and change of systems and racial and ethnic differentiation. VanderZanden.

**781 U G 5**

**The Traditions of Social Thought and Research**

A. 2 2-hr. cl.

The history of Sociology with special emphasis on ideas relevant to current theoretical issues and research methods. Walum.

**782 U G 5**

**Contemporary Theoretical Orientations in Sociology**

W. 2 2-hr. cl.

Not open to students with credit for 891.

Analysis of current schools, outlooks, and issues. Hinkle and Walum.

**Research Principles and Techniques in National Security**

(See Nat. Sec. Pol. S. 785.)

**790 U G 5**

**Social Organization of the Community**

A. 3 cl.

An examination of the nature, structures, processes, and trends of social organization of modern communities. Jonassen.

**791 U G 5**

**Sociological Methods of Community Analysis**

Sp. 3 cl.

Prereq.: 490 or 590 or equiv., and permission of instructor.

Not open to students with credit for 894.

Methods, techniques, sources of data, and objectives of community analysis. Jonassen and Schwirian.

**792 U G 5**

**Structural Sociology**

A. 5 cl.

Prereq.: Grad. standing in Soc.

Key concepts, issues, recent trends in the study of social structure with special emphasis on formal social organizations, social stratification, comparative social systems, groups and research methods. Corwin and Dynes.

**GENERAL PREREQUISITES FOR COURSES  
NUMBERED 800**

Unless otherwise indicated, the prerequisites for 800-level courses are 30 qtr. hrs. in the same discipline at the 600-level or higher, of which 15 hrs. must be at the 700-level.

**800 G 2**

**Pro-seminar in Sociology**

A. 2 cl.

Open only to 1st year grad. students in Soc.

Each week an area of specialization within sociology will be discussed by a professor whose major interest is in that area; provides an overview of special topics and current issues. Dynes and McDonagh.

**801†\* G 5**

**Seminars in the Comparative Study of Society:  
Latin America**

Sp. 3 cl.

Selected problems in the changing interrelationships among social institutions in Latin American Countries: politics, economy, education, religion, kinship, and mass media.

**802†\* G 5**

**Seminars in the Comparative Study of Society:  
The Middle East**

Sp. 3 cl.

Selected problems in the changing interrelationships among social institutions in the Middle Eastern Countries: politics, economy, education, religion, kinship, and mass media. Nagi.

**803\* G 5**

**Seminars in the Comparative Study of Society:  
The Slavic Countries**

A. 3 cl.

Selected problems in the changing interrelationships among social institutions in the Slavic Countries: politics, economy, education, religion, kinship, and mass media.

**804†\* G 5****Seminars in the Comparative Study of Society: Advanced Societies**

W. 3 cl.

Analysis of emerging problems in the social order of advanced societies, with special emphasis on the Atlantic Community

**805 G 5****Social Movements**

Sp. 5 cl.

An examination of theories and research on non-traditional group efforts to change social systems and institutions; emphasis on contemporary societies and movements. Quarantelli.

**811 G 1-5****Seminar in Industrial Sociology**

A.

Repeatable to a maximum of 10 cr. hrs.

Selected topics in sociology of industrial and work relations; organizational types, change, effectiveness, management, control, administration, leadership, occupations; theoretical approaches to study of industrial relations. Bullock and Helfrich.

**818 G 5****Advanced Criminology**

Sp.

Prereq.: 410 or equiv.

A critical study of the most important aspects of criminology. Dinitz.

**820 G 5****Seminar in the Sociology of Education**

Sp. 3 cl.

Repeatable to a maximum of 10 cr. hrs.

Special problems will be considered in different quarters, including urban education, student movements, bureaucratic-professional problems, school-community relations, and innovation. Corwin.

**825\* G 5****Seminar in the Sociology of Science**

Sp. 3 cl.

Selected problems in the study of science as a changing social institution including its relations to other institutional realms viewed in a cross-national context. Corwin and Nagi.

**830\* G 5****Seminar in Medical Sociology: Problems in the Sociology of Health Organization**

Sp. 3 cl.

Prereq.: 730 or permission of instructor.

Analysis of theory and research bearing upon the role of medicine in society and the health organizations on national, community, and institutional levels. Nagi and Petersen.

**831†\* G 5****Seminar in Medical Sociology: Problems in the Sociology of Mental Illness**

W. 3 cl.

Prereq.: 730 or permission of instructor.

Analysis of the sociological concepts of mental illness, the socio-cultural factors in these disorders, and the structure of mental care institutions. Nagi.

**832†\* G 5****Seminar in Medical Sociology: Problems in the Social Ecology of Illness**

Sp. 3 cl.

Prereq.: 730 or permission of instructor.

Analysis of current research and literature about socio-cultural factors in disease and illness; emphasis placed upon methodological problems. Nagi.

**833†\* G 5****Seminar in Medical Sociology: Problems in Social Gerontology**

A. 3 cl.

Prereq.: 730 or permission of instructor.

Analysis of the social processes and demographic changes associated with aging, and the place of the aged in the social structure. Nagi.

**836†\* G 5****Seminar in the Professions**

W. 3 cl.

Advanced comparative analysis of various professions in the United States and other societies; professionalization and the organization and influence of professions. Clarke, Corwin, and McDonagh.

**837 G 5****Seminar in Public Opinion and Political Sociology**

A. 5 cl.

Prereq.: Permission of instructor.

Selected problems in the study of opinions and opinion climates, with special emphasis on their relation to elections and political institutions in a cross-national context.

**840†\* G 5****Social and Cultural Foundations of Cities and Urbanization**

W. 5 cl.

An examination of cultural, material, social, organizational, and political and psychological factors associated with the genesis and nature of urbanization. Jonassen, Jiobu, and Schwirian.

**841†\* G 5****Sociology of Urban Sub-Communities**

W. 5 cl.

Examination of society and culture of sub-communities such as ethnic and racial ghettos, suburbia; generalizations about the pattern of integration with larger systems. Jonassen, Jiobu, and Schwirian.

**842 G 5****Human Ecology**

A. 5 cl.

Repeatable to a maximum of 10 cr. hrs.

Selected problems of urban structure from the ecological perspective. Schwirian.

**846 G 5****Seminar in the Demography of Urbanization**

Sp. 5 cl.

Prereq.: Grad. standing in Soc. or related discipline; 1 course in population or urban sociology recommended.

An analysis of urban phenomena using demographic data and techniques; an analysis of the effect of urbanization on demographic processes. W. Petersen.

**848\* G 5**

**Seminar in the Sociology of Religion**

Sp. 3 cl.

An analysis of selected contemporary problems in the sociology of religion; religious organization and involvement. Dynes and Seidler.

**850 G 1-5**

**Seminar in Sociological Research Methods**

Su, A, W, Sp.

Repeatable to a maximum of 30 cr. hrs.

Special topic seminars in research methodology.

**851 G 4**

**Population for Non-Demographers**

W, Sp.

Prereq.: One course in population.

**851.01\* Population Theories**

An analysis in depth of major population theories, including Malthus, Marxists, and exponents of the transition theory.

**851.02\* Comparative Population Policy**

Analysis of the sociological, political, economic, and ideological factors affecting demographic decisions of selected countries, including the control of size, distribution, and composition of population. Y. Tien.

**853 G 5**

**Formal Demography**

Sp. 5 cl.

Prereq.: 754.

**853.01 Advanced Demographic Analysis**

An exposition of advanced applications of the life table, stable population models, estimates from incomplete data, projections and interpolations, and similar demographic techniques. Li.

**854 G 5**

**Professional Population Training**

W, Sp.

**854.01 Comparative Sociology of Fertility**

Prereq. or concur.: 551 or 751, and 754, or equiv.

Comparative analysis of fertility in different societies at different historical periods; analysis of sources of human reproduction in institutional, interactional, and developmental perspectives; data and techniques of fertility analysis. Y. Tien.

**854.02 International Migration**

Prereq.: 756.

Analysis in historical depth of international migration, its statistics, its effects on the two countries and the migrants, and policies to inhibit or encourage international movements. Y. Tien.

**854.03 Mortality and Morbidity**

Prereq. or concur.: 551 or 751, and 853.01, or equiv.

Advanced sociological analysis of mortality and morbidity in global perspective, emphasizing the determinants and consequences of illness and mortality trends and theories of mortality differentials; statistical techniques are stressed. Schwirian.

**855 G 5**

**Area Training in Population**

A, Sp.

Prereq.: 753 or permission of instructor.

**855.01\* The Population of China**

An assessment of the size, growth, diversity, and distribution of the Chinese population, including some analysis of Chinese populations outside mainland China. Y. Tien.

**855.02\* The Population of Latin America**

Comparative analysis of components of demographic structure and change in Latin America; stress on institutional context of fertility, mortality, and migration.

**859 G 1-15**

**Practicum in Sociological Research**

W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Supervised practical experience in the independent execution of sociological research, the application of appropriate analytical techniques, and preparation of research reports.

**861\* G 5**

**Seminar in Social Stratification**

W. 3 cl.

Repeatable to a maximum of 10 cr. hrs.

Major theoretical approaches, differing bases of stratification and methods of analysis. Dynes and McDonagh.

**862 G 5**

**Seminar in Complex Organizations**

A. 3 cl.

Analysis of bureaucratization, structure, boundary problems, resource allocation, organizational change and conflict. Corwin and Dynes.

**863 G 5**

**Seminar in Small Groups**

Sp.

A critical examination of theoretical and methodological issues in research on small groups; focus on sociological contributions.

**871 G 5**

**Symbolic Interaction**

A. 5 cl.

Analysis of the relationship between the individual and the social structure; particular reference paid to the symbolic interaction orientation. Franklin and G. Hinkle.

**872 G 5**

**Social Psychology in a Comparative Sociological Perspective**

W. 4 cl.

Contemporary social psychological research in other nations; major consideration of the value and normative structures which help to explain discrepant findings.

**873 G 5****Current Research in Social Psychology of Relevance to Sociology**

Sp. 4 cl.

Analysis of theoretical developments, methodological approaches and empirical findings on special recent topics.

**880\* G 5****Seminar in Contemporary Issues in American Race Relations**

A, Sp. 5 cl.

Prereq.: 780.

Repeatable to a maximum of 10 cr. hrs.

Issues in contemporary American race relations are examined to facilitate theoretical clarification; specific seminar topics vary from quarter to quarter. Vander Zanden.

**881†\* G 5****Seminar in Theoretical Issues in Comparative Race Relations**

Sp. 5 cl.

Prereq.: 780.

Repeatable to a maximum of 10 cr. hrs.

Cross-cultural examination of stability and change in patterns of race and ethnic relations; specific seminar topics vary from quarter to quarter.

**882 G 5****Systematic Social Theory in Progress**

Sp. 2 2-hr. cl.

Examination of the logical structure and empirical status of current and emerging theories. Hinkle.

**883 G 5****Seminar in Classical Sociological Theory**

W. 2 2-hr. cl.

Prereq.: Permission of instructor.

Discussion of ten classical works in sociological theory. Hinkle.

**884 G 1-5****Seminars in Sociology**

Su, A, W, Sp.

Repeatable to a maximum of 15 cr. hrs. for each decimal subdivision.

- 884.01 Sociological Theory
- 884.02 Social Organization and Planning
- 884.03 Medical Sociology
- 884.04 Criminology and Penology
- 884.05 Sociology of Education
- 884.06 Race Relations
- 884.07 Social Psychology
- 884.08 The Family
- 884.09 Research Methodology
- 884.10 Urban Sociology
- 884.11 Graduate Seminar on Contemporary Sociological Issues
- 884.12 Unclassified
- 884.13 Population
- 884.14 Collective Behavior

**885 G 5****Seminar in Comparative Family Structures**

Sp. 5 cl.

Examination of problems, issues and trends in family organization in different societies; emphasis on present knowledge and the development of new hypotheses and research designs. Clarke and Cuber.

**888 G 1-5****Seminar in the American Family**

A. 5 cl.

An examination of relevant issues, trends, and problems with emphasis on theoretical orientations and research findings. Clarke and Cuber.

**899 G 5****Interdepartmental Seminar**

Su, A, W, Sp.

(See under Interdepartmental Seminars.)

**998 G Arr.****Research in Sociology: Thesis**

Su, A, W, Sp.

Research for thesis purposes only.

**999 G Arr.****Research in Sociology: Dissertation**

Su, A, W, Sp.

Research for dissertation purposes only.

## Spanish

Office: 248 Dieter Cunz Hall of Languages, 1841 Millikin Road

**Professors** Griffin (Chairman), Armitage, Babcock, Frosch, and Rogers (Emeritus); **Associate Professors** Garcia, Levisi, and Pardo; **Assistant Professors** Angelo, Bennett, Egea, and Iglesias.

**101 U 5****Elementary Spanish**

Su, A, W, Sp. 5 cl.

Elements of Spanish grammar, with oral and written exercises; attention to ear training and oral practice; elementary reading based on Spanish geography, history, and customs.

**102 U 5****Elementary Spanish**

Su, A, W, Sp. 5 cl.

Prereq.: 101.

The elements of Spanish grammar with abundant oral and written exercises; development of conversational skill; reading vocabulary building, attention to Spanish idioms.

**103 U 5****Intermediate Spanish**

Su, A, W, Sp. 5 cl.

Prereq.: 102 or 110.

Course conducted in Spanish.

Continuation of Spanish grammar, attention to idioms; reading of short stories, plays, and novels.

**104 U 5****Intermediate Spanish**

Prereq.: 103 or 112.

The following courses are not open to students with credit for 104, and only one of the decimal subdivisions may be taken for credit.

**104.01 Basic Course**

Su, A, W, Sp. 5 cl.

Required of Spanish majors and recommended for students who intend to continue in Spanish.

Not open to students with credit for 104 or any other 104 decimal subdivision.

Reading of Spanish short stories, plays, and novels with attention to literary appreciation; development of basic language skills; course conducted in Spanish.

**Students not planning to continue in Spanish may substitute any one of the following decimal subdivisions for 104.01.**

**104.02 Conversation**

A, W, Sp. 5 cl.

Not open to students with credit for 104 or any other 104 decimal subdivision.

Emphasis on speaking and aural comprehension; conversation materials and current newspapers.

**104.03 Culture and Civilization**

A, W, Sp. 5 cl.

Not open to students with credit for 104 or any other 104 decimal subdivision.

Aspects of Spanish civilization: geography, history, social developments, and the arts; readings and discussion in Spanish.

**104.04 Social and Political Thought**

A, W, Sp. 5 cl.

Not open to students with credit for 104 or any other 104 decimal subdivision.

Readings on the evolution of social and political ideas in Spanish America; texts in Spanish; discussion in Spanish and English.

**105 U 5****Elementary Spanish Conversation and Composition**

Su, A, W, Sp. 5 cl.

Prereq.: 104.

Course conducted in Span.

Intensive practice in oral and written Spanish, based on texts and periodicals concerned with contemporary Spain and Spanish America; grammar and idiom review.

**110 U 5, 10****Intensive Elementary Spanish**

A, W, Sp. 10 cl.

Prereq.: Permission of dept.

Not open to students with credit for 102. Students with credit for 101 or equiv. may not register for more than 5 cr. hrs.

Elementary Spanish for students wishing to acquire the basic skills in one quarter; intensive drill in form, syntax, vocabulary, and idiom; equivalent to 101 and 102.

**112 U 5, 10, 15****Intensive Spanish**

Su. 15 cl. Enrollment limited to 25 students.

Full time of student and full fees required.

Prereq.: Permission of dept. chairman.

Equiv. of 101, 102, and 103.

Students with credit for 101 or the equiv. may not register for more than 10 cr. hrs. Students with credit for 101 and 102 or the equiv. may not register for more than 5 cr. hrs. Students with credit for 103 or the equiv. may not register for credit.

Elementary and intermediate Spanish; intensive drill in forms, syntax, vocabulary, and idiom; reading of short stories and plays in Spanish.

**162 U 5****Elementary-Intermediate Spanish for Selected Students**

W. 5 cl.

Prereq.: Grade of A in 101 and permission of dept. Successful completion of 101-162-163 fulfills language requirements and satisfies prereq. for 400-level literature courses.

**163 U 5****Elementary-Intermediate Spanish for Selected Students**

Sp. 5 cl.

Prereq.: 162.

Successful completion of 101-162-163 fulfills language requirements and satisfies prereq. for 400-level literature courses.

Continuation of 162.

**193 U 1-15****Individual Studies**

Su, A, W, Sp.

Prereq.: Permission of dept.

Repeatable to a maximum of 30 cr. hrs.

**194 U 1-15****Group Studies**

Su, A, W, Sp.

Prereq.: Permission of dept.

Repeatable to a maximum of 30 cr. hrs.

**271 U 3****Spanish Literature in Translation: Medieval and Golden Age**

A. 3 cl.

Prereq.: Engl. 100 or equiv.

Not open to Span. majors.

Selection of major works in Spanish literature from the medieval period through the Golden Age in translation.

**272 U 3****Contemporary Spanish Literature in Translation**

W. 3 cl.

Prereq.: English 100 or equiv.

Not open to Spanish majors.

Selection of major works in Spanish literature from the 19th and 20th centuries in translation.

**273 U 3****Spanish-American Literature in Translation**

Sp. 3 cl.

Prereq.: English 100 or equiv.

Not open to Spanish majors.

Selection of major works in Spanish-American literature in translation.

**401 U 3****Review Grammar and Composition**

Su, A, W, Sp. 3 cl.

Prereq.: 105.

Review of Spanish grammar; composition on assigned topics and practice in translation.

**402 U 3****Intermediate Spanish Conversation and Composition**

A, Sp. 3 cl.

Prereq.: 105.

Vocabulary building, practice in speaking Spanish, conversation and composition dealing with aspects of Spanish life.

**403 U 3****Intermediate Spanish Conversation and Composition**

Su (1st term), W. 3 cl.

Prereq.: 105.

Vocabulary building, practice in speaking Spanish, conversation and composition dealing with aspects of Spanish and Spanish American life.

**404 U 5****Spanish Pronunciation**

Su, A, W, Sp. 5 cl.

Prereq.: 105.

Abundant practice with corrective exercises; some attention to problems of teaching pronunciation.

**421 U 5****Introduction to Modern Spanish Literature**

Su, A, W, Sp. 5 cl.

Prereq.: 104.

Spanish literature and literary movements of the 19th and 20th centuries and their relation to modern Spain.

**422 U 5****Spanish Literature: Middle Ages through Golden Age**

A, W, Sp. 5 cl.

Prereq.: 421.

Reading and discussion of the principal works in Spanish literature from the Cid through the Golden Age.

**423 U 5****Introduction to Modern Spanish-American Literature**

A, W, Sp. 5 cl.

Prereq.: 421.

Selections from Spanish-American literature of the late 19th and 20th centuries.

**571 G 5****Basic Spanish for Graduate Students**

A. 5 cl.

Prereq.: Grad. standing.

Credit does not apply to the minimum number of hours required for the master's or doctoral degree. No audit.

Designed primarily for students who have no formal preparation in Spanish covering basic grammar and vocabulary.

**572 G 3****Spanish for Research I**

W. 3 cl.

Prereq.: Grade of C or above in 571, or equiv.

preparation demonstrated by a placement test.

Credit does not apply to the minimum number of hours required for the master's or doctoral degree. No audit.

Repeatable twice.

Satisfactory completion of this course (grade of A or B) may be accepted by the student's dept. as evidence of a dictionary reading knowledge in fulfillment of Ph.D. language requirement.

**573 G 3****Spanish for Research II**

Sp. 3 cl.

Prereq.: Grade of A or B in 572, or equiv. preparation demonstrated by a placement test.

Credit does not apply to the minimum number of hours required for the master's or doctoral degree. No audit.

Repeatable twice.

Satisfactory completion of this course (grade of A or B) may be accepted by the student's dept. as evidence of a thorough reading knowledge in fulfillment of Ph.D. language requirement.

**605 U G 3****Advanced Composition and Conversation**

Su (2nd term), A, W, Sp. 3 cl.

Prereq.: 401 and 402 or 403.

Conducted in Spanish. History, customs, and manners of Spain and Spanish America. Iglesias.

**607 U G 5****Modern Spanish Syntax**

Su, A, W, Sp. 5 cl.

Prereq.: 421, 401, and 402 or 403.

Systematic study of Spanish grammar with composition and other exercises based on contemporary authors; modern tendencies in syntactic analysis. Egea and Iglesias.

**608 U G 3****Spanish Translating**

W. 3 cl.

Prereq.: 607 or equiv.

Translation from Spanish to English and from English to Spanish. Bennett.

**609 U G 5****Spanish Phonetics**

A, Sp. 4 cl., 1 hr. lab.

Prereq.: 404 or permission of instructor.

A detailed analysis of the phonological structure of Spanish and a contrastive comparison with English; practical problems of pronunciation and of teaching are stressed. Egea and Pardo.

**610 U G 5****The Contrastive Structures of Spanish and English**

A. 5 cl.

Prereq.: 401, 402 or 403, 404, and 421.

Phonetics, phonemics, morphology, and syntax of Spanish contrasted with English. Egea.

**621 U G 5****Cervantes**

A, Sp. 4 or 5 cl.

Prereq.: 421, and 422 or 423.

An intensive study of Don Quixote. Levisi.

**622\* U G 3****Romanticism in the Hispanic World**

W. 3 cl.

Prereq.: 421, and 422 or 423.

A study of dramatists, poets, novelists, and essayists designed to bring out the literary unity of the Hispanic world in the Romantic period.

**623†\* U G 5****The Spanish Novel of the 19th Century**

W. 4 or 5 cl.

Prereq.: 421, and 422 or 423.

A study of the development of the modern Spanish novel with particular attention to the works of Perez Galdos.

**624\* U G 3****Contemporary Spanish Fiction**

A. 3 cl.

Prereq.: 421, and 422 or 423.

A study of Spanish narrative prose from the generation of '98 to the present time. Frosch.

**625\* U G 3****Modern Drama**

A. 3 cl.

Prereq.: 421, and 422 or 423.

A survey of European drama at the beginning of the century and a detailed study of the Spanish dramatists from Benavente to Alfonso Sastre. Frosch.

**626\* U G 5****Spanish American Literature Through Romanticism**

W. 5 cl.

Prereq.: 10 cr. hrs. in Span. literature at the 400 level.

A study of the chronicles and main trends in colonial Spanish American literature; works of the Inca Garcilaso, Sor Juana and Alarcon will be included. Bennett and Frosch.

**627\* U G 5****Spanish American Literature Since Romanticism**

Sp. 5 cl.

Prereq.: 10 cr. hrs. in Span. literature at the 400 level.

The advent of 'americanismo literario'; a study of the romantics and the schools that followed up to 'modernismo.' Frosch.

**628†\* U G 3****Contemporary Spanish American Fiction**

W. 3 cl.

Prereq.: 421, and 422 or 423.

The development of narrative prose in Spanish American from the second World War to the present. Frosch.

**629 U G 3****The Generation of 1898**

Sp. 3 cl.

Prereq.: 421, and 422 or 423.

Readings in fiction, poetry, and the essay from such authors as Unamuno, Azorin, Valle-Inclan, Baroja, A. Machado, and J. R. Jimenez. Garcia.

**630†\* U G 5****Contemporary Hispanic Poetry**

A. 5 cl.

Prereq.: 421, and 422 or 423.

Currents of Spanish and Spanish American poetry from Ruben Dario to the present time. Bennett.

**631 U G 2-5****Spanish Literature**

Su. 5 cl.

Prereq.: 421, and 422 or 423.

Repeatable to a maximum of 15 cr. hrs.

**632†\* U G 3****Early Spanish American Fiction**

Sp. 3 cl.

Prereq.: 421, and 422 or 423.

The origin and development of the Spanish American novel to the 1930's. Frosch.

**693 U G 1-15****Individual Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 30 cr. hrs.

**694 U G 1-15****Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 30 cr. hrs.

**698† U G 15****Study Tour of Hispanic America**

Sp.

Prereq.: Minimum of 25 cr. hrs. in Span. and permission of dept. chairman.

Not open for grad. credit to majors in Span.

The first five weeks will be devoted to intensive study of Spanish on this University campus; the remainder of the course will be spent in travel in South America; while traveling, formal language instruction will be given by the tour leader; in South America, only Spanish will be spoken.

**721\* U G 5****Drama of the 16th and 17th Centuries**

Sp. 5 cl.

Prereq.: 421, and 422 or 423.

An intensive study of a limited number of plays of the representative dramatists of the 16th and 17th centuries. Levisi.

**722\* U G 5****Poetry of the 16th and 17th Centuries**

W. 5 cl.

Prereq.: 10 cr. hrs. in Span. literature at the 400 level.

Major poets and movements of the 16th and 17th centuries. Levisi.

**723†\* U G 5****Prose of the 16th and 17th Centuries**

W. 4 or 5 cl.

Prereq.: 421, and 422 or 423.

Selected prose works by major Renaissance and Baroque authors. Levisi.

**H783 U 3-5****Honors Course in Spanish**

Su, A, W, Sp.

Conference, library or phonetics laboratory arr.

Prereq.: 4th yr. standing with a record of A in at least half of the Span. courses and an average of B in the remainder; permission of instructor under whose supervision the work is to be completed and the Arts and Sciences Honors Committee.

Repeatable to a maximum of 15 cr. hrs.

This course offers undergraduates with special aptitudes a greater opportunity to do independent study than is possible in the ordinary course. Bennett.

**811 G 3****History of the Spanish Language**

A. 3 cl.

Prereq.: M.A. candidacy or permission of instructor.

Basic concepts of historical linguistics; the major factors of change in the history of the Spanish language from Roman times to the present. Griffin.

**812 G 3****Old Spanish I**

W. 3 cl.

Prereq.: 811 or permission of instructor.

The development of Old Spanish phonology and morphology with an introduction to the reading of Old Spanish texts. Griffin.

**813 G 3****Old Spanish II**

Sp. 3 cl.

Prereq.: 812.

A continuation of Old Spanish I, with attention to syntax, vocabulary, and dialectology. Griffin.

**814† G 5****The Structure of the Spanish Language**

A. 5 cl.

Prereq.: 610 or permission of instructor.

Examination of the structure of Spanish; the contributions of statistics, computers and generative (transformational) grammar to the study of language. Egea.

**815†\* G 3-5****Spanish Language in America**

W.

Prereq.: 620 or permission of instructor.

A linguistic approach to the theoretical and practical problems of Spanish-American dialectology. Egea.

**820 G 3****Introduction to Medieval Literature**

Sp. 3 cl.

Prereq.: M.A. candidacy or permission of instructor.

Selected readings in Spanish poetry and prose from the beginning to the end of the 15th century, partly in modernized versions. Pardo.

**821 G 3****Old Spanish Literature**

A. 3 cl.

A literary approach to medieval poetry and prose.

Pardo.

**822†\* G 5****Topics and Problems in Spanish Literature: Golden Age**

A. 3 cl.

Prereq.: 20 cr. hrs. of Span. literature at the grad. level. Qualified M.A. candidates may register with permission of instructor.

Intensive exploration of a special topic or problem. Levisi.

**823\* G 5****Topics and Problems in Spanish Literature: 19th Century**

Sp. 3 cl.

Prereq.: 20 cr. hrs. of Span. literature at the grad. level. Qualified M.A. candidates may register with permission of instructor.

Intensive exploration of a special topic or problem. Garcia.

**824†\* G 5****Topics and Problems in Spanish Literature: 20th Century**

Sp. 3 cl.

Prereq.: 20 cr. hrs. of Span. literature at the grad. level. Qualified M.A. candidates may register with permission of instructor.

Intensive exploration of a special topic or problem.

**825\* G 5****Topics and Problems in Spanish Literature: Spanish American Literature**

W. 3 cl.

Prereq.: 20 cr. hrs. of Span. literature at the grad. level. Qualified M.A. candidates may register with permission of instructor.

Intensive exploration of a special topic or problem. Bennett.

**831 G 3-5****Seminar in Spanish Literature**

Su (1st term), A.

Prereq.: Permission of instructor.

Levisi.



**832 G 2-5**  
**Seminar in Spanish Literature**  
 Su (2nd term), W.  
 Prereq.: Permission of instructor.  
 Pardo.

**833 G 3-5**  
**Seminar in Spanish Literature**  
 Sp.  
 Prereq.: Permission of instructor.  
 Frosch.

**885 G 5**  
**Introduction to Methods in the History and Criticism of Literature**  
 W. 5 cl.  
 Selected readings in basic literary history, criticism, and theory, with practice in the use of standard bibliographical aids to scholarship. Garcia.

**886 G 3**  
**Bibliography and Method**  
 A.  
 Introduction to problems, tools, and methods of linguistic and literary research. Garcia.

**Medieval and Renaissance Culture**  
 (See Medieval and Renaissance Studies 888.)

**Medieval and Renaissance Literature**  
 (See Medieval and Renaissance Studies 889.)

**993 G 1-5**  
**Individual Studies**  
 Su, A, W, Sp.  
 Prereq.: Permission of instructor.  
 Repeatable to a maximum of 15 cr. hrs.

**994 G 1-15**  
**Group Studies**  
 Su, A, W, Sp.  
 Prereq.: Permission of instructor.  
 Repeatable to a maximum of 30 cr. hrs.  
 Investigation of minor problems in the various fields of Spanish literature and language.

**999 G Arr.**  
**Research in Spanish Language or Literature**  
 Su, A, W, Sp.  
 Research for thesis purposes only.

## Speech Communication

Office: 205 Derby Hall, 154 North Oval Drive

**Professors** Brooks (Chairman), Berquist, Black (Regents), Bonner, Douglas, Emery, Fotheringham, Golden, Hale, Hull, Irwin, Knowler (Emeritus), Lewis, Mail, Monaghan, Moser (Emeritus), Riley (Emeritus), Schoen, Smallwood, Summers (Emeritus), Wagner, Wiley (Emeritus), and Yeager (Emeritus); **Adjunct Professor** Abernathy; **Associate Professors** Brittin, Brown, Elgabry, Ewing, Goff, Melnick, Smith, and Takefuta; **Assistant Professors** Burke, Cegala, Deal, Dorrell, Foley, Hairston, Hawes, Lowe, MacDonald, Makay, Nilo, Niswander, Nofsinger, Powers, Reynolds, Schweikart, Wall, and Wilcox.

**035 U 5**  
**American Speech for International Students**  
 A. 5 cl.

5 cr. hrs. will be added to graduation requirements. Often taken in conjunction with Engl. 071.

Assignment to both English and the appropriate speech communication course is made on the basis of examinations given at the beginning of each quarter to all new students whose native language is not English. Goff.

**040 U 0 or 3**  
**Personal Speech and Hearing Rehabilitation**  
 A, W, Sp. 5 cl.

Credit shall not count toward graduation.

For students with speech or hearing disorders.

Repeatable.

Personal speech and hearing rehabilitation for individuals with articulation, voice, or stuttering problems of speech or with impaired hearing. Goff.

**105 U 5**  
**The Communication of Ideas and Attitudes**

Su, A, W, Sp. 5 cl.

The analysis, formulation, organization, development, and delivery of ideas and attitudes within contemporary issues by means of audience analysis and dialogue. Makay.

**110 U 5**  
**Group Discussion**

Su, A, W, Sp. 5 cl.

Designed to develop the attitudes, skills, and knowledge of methods favorable to effective participation in discussion by conferences, committees, and other small groups. Hunt.

**115 U 3**  
**Broadcasting in America**

A, W, Sp. 3 cl.

The process of mass communication; the effects of mass media on society, and the structures society imposes on the media.

**125 U 3**  
**Parliamentary Law**

W. 3 cl.

Study of the rules of procedure by which self-governing organizations transact business. Golden.

**135 U 3****Voice and Diction**

A, W, Sp. 3 cl.

Not open to students with credit for 120.

Introductory study of the principles of a satisfactory speaking voice; designed for the student concerned about the adequacy of his speech. Goff.

**201 U 5****Introduction to Speech Communication**

A, W, Sp. 5 cl.

Designed for students who wish to have a broad overview and understanding of the field of speech communication. Brooks.

**205 U 1****Communication Co-Curricular Activities**

A, W, Sp.

Each category repeatable to a maximum of 6 cr. hrs.

Prereq.: Permission of instructor.

Participation in specialized activities.

- Communication Laboratory Projects. Nofsinger.
- Forensics.
- Oral Interpretation.
- Television and Radio Broadcasting.

**209 U 3****Communication Theories and Models**

A, W, Sp. 3 cl.

Communication model characteristics; structure and function, general principles; basic processes and major types of activities; receivers and effects; motivations, value systems, and norms. Cegala and Wall.

**210 U 3****Introduction to Telecommunication Production**

A, W, Sp. 3 cl.

Not open to students with credit for 229.

Assets and liabilities of the telecommunications media; basic principles, procedures, techniques, and costs involved in telecommunications production. Foley.

**213 U 5****Rhetoric in Western Thought**

A, W, Sp. 5 cl.

Rhetorical theories as they reflected and affected society from Greece to modern times; relations to logic, ethics and poetics; the classical tradition versus sophisticated concepts. Berquist and Golden.

**215 U 3****Elements of Telecommunication**

Su, A, W, Sp. 3 cl.

Prereq.: Speech Communication majors or permission of instructor.

Not open to students with credit for 115.

Introduction to the evolution and operation of the telecommunication media; the structures of media programming; basic processes of the media. Foley.

**217 U 5****Rhetoric of American Issues**

A, W. 5 cl.

A study of selected American orators, their speeches, and the audience reactions on significant issues during 1830-1962. Brown.

**221 U 5****Fundamentals of Oral Interpretation**

A, W, Sp. 5 cl.

Introductory course to develop understanding and appreciation of literature through the oral re-creation of literary materials and critical listening. Brooks.

**225 U 5****Persuasive Communication**

Su, A, W, Sp. 5 cl.

Analysis of persuasive communication as a form of influence; the process and functions involved, its potential and limitation for individuals and organizations. Cegala.

**235 U 3****Speech Functions and Responsibilities of the Teacher**

Su, A, W, Sp. 3 cl.

A study of speech and hearing deviations commonly found in the classroom and of the role of the teacher. Deal, Powers, and Wilcox.

**240 U 3****Bases of Oral Communication**

Su, A, W, Sp. 3 cl.

A study of the theories of the production and perception of speech. Powers and Takefuta.

**250 U 3****The Development of Speech and Language in Children**

A, W, Sp. 3 cl.

The growth of speech and language in children; theories of speech and language development; causes of speech and language aberrations. Goff.

**305 U 5****Argumentation and Debate**

A, W, Sp. 5 cl.

Principles of reasoned discourse and their application to controversial issues.

**315 U 3****Informative Communication**

A, W. 3 cl.

Analysis of potentials and limitations of informative communications for individuals and groups as communicatees or communicators; processes and functions of informative communications in diverse situations. Douglas.

**325 U 3****Communications and Society**

A, W, Sp. 3 cl.

Communications and the role of government, pressure groups, and other segments of society; the impact of communications on individual and collective behavior. Emery.

**330 U 3****Rhetoric of Black Americans**

W, Sp. 3 cl.

Examination of the rhetoric of Black Americans in connection with such strategies as assimilation, separation, and revolution, to establish a role or identity in American society. Hale and Smallwood.

410 U 4

**Program Processes in Radio**

A, W, Sp. 3 cl.

Prereq.: 210.

The program functions in radio communication including the planning, production, and direction of programs.

420 U 3

**Symbol Systems and Communication Behavior**

A, Sp. 3 cl.

Study of the nature and forms of symbolic behavior; the human uses of symbols, particularly in communication. Fotheringham.

440 U 5

**Anatomy and Physiology of the Ear and Vocal Mechanisms**

A, W. 5 cl.

Prereq.: 240.

A study of the organs and systems of the body related to the processes of speech and hearing. Deal.

505 U G 5

**Forms of Public Address**

Su, A, W, Sp. 5 cl.

The organization, style, and delivery of speeches for special occasions. Berquist, Makay, and Wall.

510 U G 5

**Program Processes in Television**

A, W, Sp. 5 cl.

Prereq.: 210.

Creating, planning, producing, and directing of the television program; development of program forms, program sources, programming organization, and program evaluation. Lowe.

515 U G 3

**Organizational Communication**

W, Sp. 3 cl.

A study of the communicator and communication systems in organizations with emphasis on theory, relationships, and objectives. Hawes and Hunt.

520 U G 3

**Communication and Social Behavior**

W, Sp. 3 cl.

Communication processes underlying social and cultural pressures on the individual; communication analysis of behavior; techniques of inquiry into forms of symbolic influence. Douglas.

525 U G 4

**Broadcasting and Written Messages**

W. 3 cl.

Analysis of program types in relation to writing effectiveness; communication significance of content and style elements in television and radio. Monaghan.

530 U G 5

**Communication and the Task-Oriented Group**

W. 5 cl.

Prereq.: 110 or equiv.

Information gathering, processing, and communicating phases of small group communication with emphasis on recent, socially significant task forces and on group reports generated in class. Wall.

540 U G 5

**Introduction to Audiology**

A, Sp. 5 cl.

Prereq.: 240; concur. 440.

The study of hearing, both normal and abnormal, with information on the nature, causes, identification, and rehabilitative treatment of persons with hearing disorders.

545 U G 3

**Principles of Phonetics**

A, W, Sp. 3 cl.

Prereq.: 240 recommended.

The available descriptions of the sounds of speech and a comparative study of the systems of representing the sounds. Black and Takefuta.

550 U G 3

**Introduction to Speech Pathology**

A, W, Sp. 3 cl.

Prereq.: 240, 245, and 250.

A study of disorders of speech; information on prevalence, causes, types, and effects. Goff and Powers.

555 U G 3

**International Broadcasting**

Su, Sp. 3 cl.

Dimensions of national and international broadcasting; satellite communication, types of programming; problems of effective transmission and reception of foreign broadcasts—organizational, cultural, political, and economic. Emery.

**The Teaching of Speech in Secondary Schools**

(See Ed Hums 556)

611 U G 3

**Advanced Oral Interpretation**

W, Sp. 3 cl.

Prereq.: 221 or grad. standing.

A study of programming non-dramatic literature for communication by groups; novel, short story, and verse stressed; laboratory experiences in Readers Theatre and Chamber Theatre. Brown.

616 U G 5

**Communication in Decision-Making**

W. 5 cl.

Decision-making as a process; comparisons between interpersonal, bargaining-negotiation contexts, and groups and organizations; descriptive and prescriptive models of decision-making in small groups and organizations. Hawes.

621 U G 5

**Theories of Rhetoric**

A. 5 cl.

Reading and detailed study of the theories of principal rhetoricians from ancient to modern times. Golden.

**626 U G 5****Broadcast Audience Analysis**

W, Sp. 4 cl.

Introduction to various inquiry methods which may be used for understanding and developing communication processes involving the media producer and his intended audiences. Foley and Monaghan.

**630 U G 3****Creative Processes in Telecommunication**

A. 3 cl.

Aesthetic and creative processes in program creation and evaluation; analysis of the influences of style, content, and treatment. Foley.

**Teaching Dramatics and Oral Interpretation in Secondary Schools**

(See Ed Hums 631)

**632 U G 3****Theories of Auditory Rehabilitation**

Su, A, W, Sp. 3 cl., 2 1-hr. labs.

Prereq.: 540.

A study of the major theories and procedures for teaching speech reading and auditory training. Wilcox.

**633 U G 2****Psychology of the Audience**

A.

Prereq.: 10 cr. hrs. in speech communication or permission of instructor.

Not open to students with credit for Psych. 633. Descriptive and experimental studies of audience behavior; dimensions and patterns of audience stimulation; measurements of affects of communication, communication analysis; listening. Wall.

**636 U G 3****Principles of Audiometry**

W, Sp. 3 cl.

Prereq.: 540.

A study of the techniques of hearing assessment in clinical, educational, industrial, and medical settings.

**640 U G 5****Speech Pathology: Disorders Associated with Physical Anomalies**

Su, W. 5 cl.

Prereq.: 440 and 550.

Consideration of theories, principles, and procedures for appraisal and treatment of deviant voice and articulation that accompanies cleft palate, cerebral palsy, maxillofacial injuries, and other physical disabilities. Deal.

**644 U G 3****Theories of Language Development of the Deaf**

A. 3 cl.

Prereq.: 250 and Ed Excep 651.

Study of the communicative processes of acoustically handicapped individuals: symbolization, meaning, syntax. Wilcox.

**648† U G 3****The Pre-School Deaf Child**

Su. 3 cl.

Prereq.: 250 and Ed Excep 659, 660.

Study of the problems of communication of the deaf child. Wilcox.

**652 U G 5****Stuttering: Theories and Therapies**

W, Sp. 5 cl.

Prereq.: 550 and 10 cr. hrs. in psychol.

Theories, principles, and procedures for the appraisal and treatment of persons with dysfluencies in speech. Irwin and Powers. Fee.

**655 U G 3****Speech Pathology: Appraisal**

Su, W. 2 cl., 2 lab. hrs.

Prereq.: 550 and 9 cr. hrs. in psych.

Not open to students with credit for 656.

Basic principles, procedures, and techniques in interviewing and the evaluation of articulation, voice, language, rhythm; experience in appraisal and writing examination reports. Irwin.

**660 U G 5****Speech Pathology: Articulation and Voice**

Su, W. 5 cl.

Prereq.: 135 and 550.

Not open to students with credit for 656.

Principles and procedures and techniques for the treatment of speech disorders with emphasis on vocal and articulatory deviations not associated with physical disabilities. Irwin.

**Advanced Methods in School Speech and Hearing Therapy**

(See Ed Excep 663)

**670 U G 3****Analysis of Language and Communication**

Sp.

Prereq.: 10 cr. hrs. in psych. and 10 cr. hrs. in speech communication.

Not open to students with credit for Psych. 670.

Descriptive and experimental studies of speech and language processes; learning, vocal and visible symbolism, language and thought, information processing; communication behavior patterns. Nofsinger.

**693 U G 1-5****Individual Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Conference, library, and laboratory work.

**698 U G 6-15****International Study Tour**

Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 30 cr. hrs.

Intensive five-week study on campus followed by six-week study abroad; topics to be announced.

**701 U G 4****Research Methodologies in Speech Communication**

Predominant research methodologies in the field of speech communication.

**701.01 Statistical Concepts and Logic**

A, W.

Prereq.: Permission of instructor.  
Fotheringham.

**701.02 Measurement of Communication Variables**

Sp.

Prereq.: 701.01.  
Fotheringham.

**701.03 Experimental Design**

A.

Prereq.: Permission of instructor.  
Cegala.

**701.04 Humanistic Communication Analysis**

A.

Prereq.: Permission of instructor.  
Monaghan.

**701.05 Content and Interaction Analysis**

W.

Prereq.: 701.01 or equiv.  
Hawes.

**701.06 Computer Applications**

Sp.

Prereq.: Permission of instructor.  
Foley.

**701.07 Field Study and Participant Observation**

W.

Prereq.: Permission of instructor.  
Nofsinger.

**701.08 Historical Analysis**

W.

Prereq.: Permission of instructor.  
Berquist.

**701.09 Rhetorical Analysis and Criticism**

Sp.

Prereq.: Permission of instructor.  
Brown.

**701.10 Legal Research**

A.

Prereq.: Permission of instructor.  
Emery.

**703 U G 3****Attitude Theories and Communication**

A. 3 cl.

Consistency, stimulus-response, functional, social judgment, and dissonance theories of attitude are examined in relation to communication theory, research, and measurement. Wall.

**704 U G 5****Practicum in Organizational Communication**

Sp. 1 2-hr. cl., 1 3-hr. lab.

Prereq.: 515 or equiv. and permission of instructor.  
Repeatable to a maximum of 10 cr. hrs.

Class discussion and first-hand observation of communication systems in organizations with emphasis on student exposure to the daily routine activities of selected organizations. Hunt.

**705 U G 3****Principles of Rhetorical Criticism**

Sp. 3 cl.

Principles, functions, and methods of rhetorical criticism as it relates to public address. Makay.

**715 U G 3****Broadcasting and the Public Interest**

Su, W, Sp. 3 cl.

Communication significance of "public interest" concept in broadcasting; effect on program standards, self-regulation, government regulation. Emery.

**735† U G 3****Hearing Aids and Auditory Training**

Su. 3 cl.

Prereq.: 540 and 636.

Operational principles of individual and group amplification systems for those with hearing impairments.

**745 U G 3****Theories of Speech Development of the Deaf**

W. 3 cl.

Prereq.: 240, 545, and 644.

Study of the development of speech under conditions of minimum auditory stimulation and acoustic feedback. Wilcox.

**752 U G 3****American Dialects**

A. 3 cl.

Prereq.: 545.

Comparative phonetics and lexical usages with an emphasis on social dialects in American speech.

**755 U G 3****Beginning Practicum in Speech and Hearing**

A, W, Sp. 2 cl., 7 1-hr. labs.

Prereq.: Permission of instructor.

Repeatable to a maximum of 12 cr. hrs.

Supervised practice in appraisal and treatment.

- a. Speech Pathology  
Vocal and articulatory disorders.
- b. Audiology  
Hearing disabilities.

**777† U G 3****Teaching of American Speech to Speakers of Other Languages I**

W. 3 cl., 2 lab. hrs.

Concur.: Engl. 777.

Approaches to teaching American speech and special study of the perception and motor production of the acoustic patterns of English (TESOL Program). Goff.

**778† U G 3****Teaching of American Speech to Speakers of Other Languages II**

Sp. 1 cl., 4 lab. hrs.

Prereq.: 777; concur. Engl. 778.

Techniques for improving listening and speaking skills of speakers of other languages learning American English; development of materials and use of audio laboratories (TESOL Program.) Goff.

**H783 U 3-15****Honors Course**

Su, A, W, Sp.

Prereq.: 4th yr. standing, with a grade of A in at least half of the speech communication courses and an average of B in the remainder; permission of the instructor under whose supervision the work is to be completed and the Arts and Sciences Honors Committee.

Repeatable to a maximum of 15 cr. hrs.

A program of independent study for the student with special aptitudes; individual conferences and reports.

**794 U G 3****Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

**797 U P G 3****Interdepartmental Seminars**

W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 12 cr. hrs.

- a. Language Disorders in Children. W. MacDonald.
- b. Audiometric Assessment in Mental Retardation. W. Niswander.
- c. Language Therapy in Mental Retardation. Sp. MacDonald.
- d. Mental Retardation. Sp. Niswander.
- e. Auditory Rehabilitation. Sp. Wilcox.

(See under Interdepartmental Seminars.)

**802 G 3****Communication Theories and Models**

A. 1 3-hr. cl.

The formal principles of theory and model construction function as criteria for examining the strengths and weaknesses of four classes of interpersonal communication models. Nofsinger.

**803 G 3****Contemporary Persuasion Theory**

W. 3 cl.

Study of the viewpoints and theoretical explanations of persuasive effects found among major contemporary authors in the field. Fotheringham.

**806 G 3****Advanced Studies in Television and Radio**

W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

- a. Mass Media and Analysis of Public Interest. A. Monaghan.
- b. History of American Public Broadcasting. W. Emery.
- c. Philosophy of Mass Communication. W. Monaghan.

**811 G 3****Seminars in History and Criticism of Public Address**

Su. A.

Prereq.: Permission of instructor.

Repeatable to a maximum of 40 cr. hrs.

- a. Rhetoric of Social Protest. Su. Brown.
- b. Anglo-American Rhetoric and the American Revolution. A. Berquist.
- c. American Culture and Public Address. A. Brown.

**816 G 3****Seminars in Rhetorical Theory**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 25 cr. hrs.

- a. Rhetoric and Dialogical Communication. Su. Makay.
- b. Religious Communication. A. Golden.
- c. Attitude Change and Rhetorical Theory. W. Brown.
- d. Classical Rhetorical Theory. W. Makay.
- e. Contemporary Rhetorical Theory. Sp. Golden.

**821 G 3****Seminars in Television and Radio**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 40 cr. hrs.

- a. Media Technology and Developing Countries. Su. Emery.
- b. National and International Systems of Broadcasting. A. Emery.
- c. FCC: Anatomy of a Regulatory Agency. W. Emery.
- d. Cable Television. W. Foley.
- e. Telecommunications Regulation. Sp. Foley.
- f. Social Innovation and Change through Mass Communication. Sp. Monaghan.

**826 G 3****Seminars in Communication Behavior**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 40 cr. hrs.

- a. Interpersonal Communication. Su. Douglas.
- b. Human Resources and Communication Behavior Organizations. A. Hunt.
- c. Internal Variables. W. Douglas.
- d. Trends in Oral Interpretation. W. Hairston.
- e. Dyadic Communication. Sp. Hawes.
- f. Social Dimensions of Communication. Sp. Douglas.

**832 G 5****Experimental Phonetics**

Sp. 3 cl., 2 2-hr. labs.

Prereq.: 545, 856, or permission of instructor.

A study of experimental investigations of acoustic, physiological, and psychological aspects of speech and related laboratory experiments. Black.

**836 G 5****Disorders of Communication Associated with Neuropathologies**

Su. 5 cl.

Study of the nature, diagnosis, prognosis, and treatment of speech manifestation in dysarthria and aphasia. Deal.

844 G 1-10

**Advanced Practicum in Speech and Hearing**

W. 1 cl., 3 clinical hrs. for each hour of credit per week.

Prereq.: Permission of instructor.

Repeatable to a maximum of 45 cr. hrs.

Advanced practicum in speech, hearing, and language.

848 G 3

**Interdisciplinary Functioning in Disorders of Oral Communication**

W. 4 cl.

Prereq.: 616, 836, and 844.

The diagnosis and treatment of profound speech and hearing disorders and the joint rehabilitation treatment accorded pathological ear and vocal mechanisms by ancillary disciplines. Grimm.

856 G 3

**Speech and Hearing**

W. 3 cl.

Prereq.: 540 or equiv. and Physics 501.

Repeatable to a maximum of 6 cr. hrs.

Theoretical concepts and physiological and psychophysical data relative to hearing with particular reference to the preception of speech. Black.

**Seminars in Education**

(See Ed Hums 925.09)

899 G 3

**Interdepartmental Seminar**

A, W, Sp.

Prereq.: Permission of instructor.

a. Mass Communication Law. A. Emery.

(See Interdepartmental Seminars.)

940 G 3

**Advanced Studies in Speech and Hearing Science**

A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 45 cr. hrs.

- a. Design of Experiments in Speech and Hearing. A. Black.
- b. Interpretating Audiometric Results. W. Nilo.
- c. Instrumentation in Speech and Hearing. A. Takefuta.
- d. Disorders of Articulation. Sp. Irwin.
- e. Advanced Audiometry. Su, W. Niswander.
- f. Disorders of Voice. A. Deal.
- g. Maxillary Facial Disorders. Sp. Powers.
- h. Computer Analysis of Speech Signals. Su. Takefuta.

950 G 3

**Seminar in Speech and Hearing Science**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 45 cr. hrs.

- a. Acoustic Spectrography. W. Takefuta.
- b. Psychoacoustics. Sp. Melnick.
- c. Management and Supervision. A. Goff.
- e. Supervision and Counseling. Irwin.
- d. Pediatric Audiometry. A. Niswander.

990 G 3

**Areas and Techniques of Research in Speech Communication**

Su, A. 3 cl.

Prereq.: 25 cr. hrs. in speech communication.

A review and critical commentary on typical methods of research in each of the principal areas of graduate research in speech; research reports. Douglas.

994 G 3

**Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

998 G Arr.

**Research in Speech Communication: Thesis**

Su, A, W, Sp.

Repeatable to a maximum of 5 cr. hrs.

Research for thesis purposes only.

999 G Arr.

**Research in Speech Communication: Dissertation**

Su, A, W, Sp.

Research for dissertation purposes only.

## Statistics

Office: 128 Cockins Hall, 1958 Neil Avenue

**Professors** Whitney (Chairman), Rustagi, and Willke;  
**Associate Professors** Dudewicz and Srivastava;  
**Assistant Professors** Anderson, Archambault, Singh, and Wolfe.

123 U 5

**Statistics for the Business, Social, Biological Sciences**

Su, A, W, Sp. 5 cl.

Prereq.: Math. 122.

Not open to students with credit for Math. 123, or 120.05 or 120.06.

Introduction to the basic concepts of probability and statistics; sample statistics, discrete and continuous probability distributions; confidence intervals, estimation, tests of hypotheses.

125 U 5

**Elementary Mathematical Statistics**

Su, A, W, Sp. 5 cl.

Prereq.: Satisfactory score on O.S.U. Math. Placement Test (Level 3).

Not open to students with credit for Econ. 442, Ed. 786, Genetics 650, Pol. Sci. 685, Psychol. 220, 510, or Soc. 380.

Elementary principles of probability and introduction to the use of the binominal and normal distributions.

180 U 5

**Choice and Chance**

A, Sp. 5 cl.

Prereq.: Level 3 placement on O.S.U. Math. Placement Test and permission of Dept.; or permission of instructor.

Not open to students with credit for any Statistics course.

A liberal arts course presenting the concepts of probability, statistical uncertainty, and decision-making, and their role in society and science.

194 U 3-5

**Group Studies**

A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

Designed to give groups of students an opportunity to pursue special studies not otherwise offered.

223 U 5

**Elementary Decision Theory**

Su, W. 5 cl.

Prereq.: Math. 116, 121 or 150.

Descriptive statistics, probability, utility, Bayes strategies, minimax strategies, and statistical inference.

421 U 3

**Introduction to Statistics**

W.

Prereq.: Math. 254 or permission of chairman.

Combinatorial probability, fundamental concepts of probability distributions, sample statistics, estimation and testing hypotheses, roots of statistical theory.

425 U 5

**Probability and Statistics I**

A, W, Sp.

Prereq.: Math. 254 or permission of chairman.

Elements of discrete and continuous probability; introduction to estimation and testing of hypotheses.

426 U 5

**Probability and Statistics II**

A, W, Sp.

Prereq.: 425 or Math. 425.

Continuation of 425.

494 U 3-5

**Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

Designed to give groups of students an opportunity to pursue special studies not otherwise offered.

505 U G 5

**Introduction to Analysis, Probability, and Statistics I**

A. 5 cl.

Prereq.: Permission of instructor or graduate standing in M.B.A. or M.P.A. programs and previous training in calculus.

Not open to students with credit for Math. 123 or any higher level mathematics or statistics course.

Mathematical methods and concepts related to applications in the business and social sciences.

506 U G 5

**Introduction to Analysis, Probability, and Statistics II**

W. 5 cl.

Prereq.: 505.

Not open to students with credit for Math. 123.

Continuation of 505.

518 U G 3

**Statistical Theory in Medical Research I**

A. 3 cl.

Prereq.: Permission of instructor, special grad. students in medical sciences.

Fundamental concepts of probability, random variables, statistical inference, regression and correlation analysis; topics selected from bioassay, life table techniques, computers in medicine.

519 U G 3

**Statistical Theory in Medical Research II**

W. 3 cl.

Prereq.: 518 or Math. 528.

Continuation of 518.

520 U G 5

**Mathematical Statistics I**

Su, A, W. 5 cl.

Prereq.: Math. 254 or permission of chairman.

Permutations, combinations, probability; discrete and continuous distributions; Binomial, Poisson, normal chi-square, t, F distributions; limit theorems of probability.

521 U G 5

**Mathematical Statistics II**

Su, W, Sp. 5 cl.

Prereq.: 520 or Math. 520.

Testing simple hypotheses; applications of t test, chi-square tests, F tests, nonparametric tests; confidence intervals.

525 U G 5

**Statistical Methods**

A.

Prereq.: Math. 254 or equiv. and permission of instructor; or Math. 254 or equiv. and grad. standing.

Basic concepts of probability and statistical inference; application to models involving binomial, Poisson, and normal distributions, and linear regression.



**528 U G 3****Data Analysis I**

Su, A. 2 cl., lab. hrs. arr.

Prereq.: Permission of instructor or grad. standing.

Not open to students with more than 5 cr. hrs. in Statistics.

Non-calculus treatment of descriptive statistics, statistical inference, goodness of fit, use of  $t$ ,  $F$ ,  $X^2$  in one sample situation.

**529 U G 3****Data Analysis II**

Su, W. 2 cl., lab. hrs. arr.

Prereq.: 528.

Two sample tests, non-parametric one and two sample procedures, regression analysis, one and two way analysis of variance.

**532† U G 3****Discrete Probability**

W. 3 cl.

Prereq.: 426 or 520.

Discrete probability spaces, random walk, Markov chains, stochastic processes, strong laws of probability.

**593 U G 2-5****Individual Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

**594 U G 2-5****Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

**600 U G 1-5****Statistics Laboratory**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 10 cr. hrs.

Experience is given the student in working with real data through association with current projects in the Statistics Laboratory.

**623 U G 3****Mathematical Statistics Supplement**

A. 3 cl.

Prereq.: 426 or equiv. and permission of instructor.

Not open to students with credit for 521.

Distributions of sample statistics, order statistics, limit theorems, sufficient and efficient estimates, likelihood ratio tests.

**632 U G 3****Applied Stochastic Processes**

A. 3 cl.

Prereq.: 520 or Math. 520.

Normal processes and covariance stationary processes, counting processes and Poisson processes, renewal processes.

**635 U G 3****Statistical Analysis of Time Series**

Sp.

Prereq.: 521 or 623 or permission of instructor.

Time series models; estimation of the spectral density function; transformations of time series; prediction theory. applications.

**641 U G 3****Linear Models**

W. 3 cl.

Prereq.: 426 or 521, and an elementary knowledge of matrix theory and notation.

The general linear model for regression and experimental designs; properties of least square estimates; distribution of quadratic forms and the analysis of variance table.

**645 U G 5****Design of Experiments**

Su, A, Sp.

Prereq.: 426 or 521 or 525.

Polynomial and multiple regression; factorial balanced incomplete block, nested designs and others; analysis of covariance; prepared computer programs used on sample data in laboratory periods.

**651 U G 3****Survey and Sampling Theory**

Su. 3 cl.

Prereq.: 521 or 623 or permission of instructor.

Sampling from finite populations, multistage sampling, stratification, regression and ratio estimates, non-sampling errors, applications to large scale sample surveys.

**661 U G 5****Applied Nonparametric Statistics**

Su, W, Sp.

Prereq.: 426 or 521 or 529 or equiv.

Non-calculus treatment of nonparametric tests, confidence intervals, estimation; topics include one- and two-sample problems, one- and two-way analysis of variance, multiple comparisons, correlation.

**693 U G 1-5****Individual Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Individual conferences, assigned readings, and reports on minor investigations.

**694 U G 2-5****Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Designed to give groups of students an opportunity to pursue special studies not otherwise offered.

**725\* U G 3****Sequential Procedures in Statistics**

A. 3 cl.

Prereq.: 521 or 623, and Math. 550.

Sequential tests of hypotheses and their operating characteristics, Wald's SPRT tests, sequential estimation, sequential designs and multiple decision procedures.

**742 U G 3****Analysis of Variance**

A. 3 cl.

Prereq.: 521 or 623; Math. 550; and Math. 471 or 571 or 601.

Theory of the general linear model; least square estimates and properties, especially in non-full rank models; analysis of variance technique; factorial designs.

**746 U G 3****Design and Analysis of Experiments**

W. 3 cl.

Prereq.: 742 or Math. 720.

A continuation of 742; various experimental designs; analysis of covariance, mixed and random models.

**755 U G 3****Multivariate Analysis I**

W. 3 cl.

Prereq.: 521 or 623; Math. 471 or 571 or 601; and Math. 551.02 or 623.

Multivariate normal distribution, Wishart distribution, Hotelling's  $T^2$  multivariate analysis of variance, multiple correlation, roots of determinant equations, discriminant functions, and applications.

**756 U G 3****Multivariate Analysis II**

Sp. 3 cl.

Prereq.: 755 or Math. 726.

Continuation of 755.

**761 U G 3****Order Statistics**

A. 3 cl.

Prereq.: 521 or 623, and Math. 551.02 or 653.

Exact and asymptotic distributions and moments of order statistics, estimating parameters and testing hypotheses using order statistics, confidence intervals, and tolerance regions.

**763 U G 3****Nonparametric Statistics**

Sp. 3 cl.

Prereq.: 761 or Math. 728.

Theory of testing hypotheses, single, double and k sample problems, rank orders, measures of correlation, large sample properties.

**777†\* U G 3****Optimizing Methods in Statistics**

Sp. 3 cl.

Prereq.: Permission of instructor.

Survey of classical optimizing techniques with applications in statistics, mathematical programming and constrained estimation, variational methods and dynamic programming applied to statistical problems, miscellaneous applications.

**794 U G 2-5****Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

**821 G 3****Statistical Inference I**

W. 3 cl.

Prereq.: 521 or 623, and Math. 722.

Classical and modern statistical inference from advanced point of view, estimation, principles of maximum likelihood, Asymptotic theory; completeness, sufficiency and invariance.

**822 G 3****Statistical Inference II**

Sp. 3 cl.

Prereq.: 821 or Math. 824.

**824 G 3****Statistical Decision Theory I**

A. 3 cl.

Prereq.: Permission of instructor.

Introduction to the theory of games, statistical games, admissibility and completeness, complete class theorem, principles of sufficiency and invariance, sequential games.

**825 G 3****Statistical Decision Theory II**

W. 3 cl.

Prereq.: 824 or Math. 826.

Continuation of 824.

**828\* G 3****Statistical Multiple Decision Procedures**

Sp. 3 cl.

Prereq.: Permission of instructor.

Comparisons with a standard, the ranking of parameters different formulations, same multivariate and non-parametric problems of ranking and selection.

**832†\* G 3****Applied Probability Models**

A. 3 cl.

Prereq.: Math. 722.

Birth and death processes, Queueing Theory, Branching processes and other applied probability models.

**834†\* G 3****Statistical Inference for Stochastic Models**

W. 3 cl.

Prereq.: 832.

Theory of statistical inference for Markov Chains and other applied probability models.

**847\* G 3****Advanced Design of Experiments**

Sp.

Prereq.: 746 or Math. 721.

Partially balanced designs, factorial experiments, confounding and factorial replications, response surface designs.

**881 G 3**  
**Advanced Topics in Mathematical Statistics I**  
 Su. 3 cl.  
 Prereq.: Permission of instructor.  
 Topics to be taken from the following: multivariate analysis, stochastic processes, analysis of variance, components of variance models, advanced test design.

**882 G 3**  
**Advanced Topics in Mathematical Statistics II**  
 Su. 3 cl.  
 Prereq.: 881 or Math. 925.  
 Continuation of 881.

**888\* G 3**  
**Large Sample Theory**  
 A. 3 cl.  
 Prereq.: 822.  
 Mann-Wald theory of stochastic order relationships; asymptotic distribution of maximum likelihood estimates and likelihood ratio statistic, large deviation theory, asymptotic theory of well known statistics.

**999 G Arr.**  
**Research**  
 Su, A, W, Sp.  
 Research for thesis or dissertation purposes only.

## Surgery

Office: N-747 University Hospital, 410 West 10th Avenue

**Professors** Robert Zollinger (Chairman), Boles, Clatworthy, Curtiss, Hardyman, Hunt, James, Keith, Klassen, Pace, Patton, Wiltberger, Winter, and Richard Zollinger; **Associate Professors** Berggren, Bingham, Cerilli, Coleman, Duran, Evans, Furste, Heydinger, B. Smith Kent, Kilman, Lacey, Meagher, Meckstroth, Miller, Morse, Nick, Sayers, Stoner, Taylor, Tetirick, Thomford, Vasko, and Yashon; **Assistant Professors** Arnold, Barnes, Bonta, Cogbill, Eyring, Fusco, Ireton, Kirk, Lewis, Minton, Puppel, Rauch, J. Roberts, F. Smith, J. Smith, Stewart, Williams, Wise, and Zox; **Instructors** Atkinson, Beattie, Bock, Bolz, Brewer, K. Brown, R. Brown, Cattaneo, Crawford, Creedon, Denkwalter, Dickens, Doolittle, Ebert, Finley, C. Hamilton, E. Hamilton, Harris, Hawk, Haynes, Hess, Houser, Kakos, Kessler, D. King, Knerr, Larrick, Leimbach, Lovingood, Maxwell, McCloud, Meyer, Moysaenko, Redmond, Riemenschneider, Sirinek, Traphagen, Turnipseed, Weis, and Whitehouse.

**715 P 6 or 12**

**Clinical Surgery**  
 Offered all months.  
 Prereq.: Med. 3rd yr. standing.  
 Must repeat to 12 cr. hrs.  
 The student serves as clinical clerk both in inpatient and outpatient departments on the General Surgical Services, with instruction in total patient care.

**736 P 5, 6, or 11**  
**Clinical Surgery**  
 Offered all months.  
 Prereq.: Med. 4th yr. standing; concur. Anes. 737 when registration is for 5 or 11 cr. hrs.  
 Must repeat to 11 cr. hrs.  
 Total inpatient and outpatient management of surgical disease; emergency room, orthopaedics, neurosurgery, thoracic surgery, plastic surgery, urology, pediatric general surgery, and general surgery.

**793**  
**Individual Studies in Surgery**  
 1, 2, 3, or 4 months. P  
 Su, A, W, Sp. G 3-5  
 Prereq.: Permission of instructor.  
 Repeatable to a maximum of 15 cr. hrs. for grad. credit.

**793.02 General Surgery P 6, 12**  
 1 or 2 months; offered all months.  
 Repeatable to a maximum of 12 cr. hrs. for professional credit.

**793.03 Neurological Surgery P 6, 12, 18**  
 1, 2, or 3 months; offered all months.  
 Repeatable to a maximum of 18 cr. hrs. for professional credit.

**793.04 Orthopaedic Research P 6, 12, 18**  
 2, 3, or 4 months; offered all months.  
 Must repeat to a minimum of 12 cr. hrs.; may repeat to a maximum of 24 cr. hrs. for professional credit.

**793.05 Pediatric Surgery P 6, 12**  
 1 or 2 months; offered all months.  
 Repeatable to a maximum of 12 cr. hrs. for professional credit.

**793.06 Urology P 6, 12**  
 1, 2, or 3 months; offered all months.  
 Repeatable to a maximum of 12 cr. hrs. for professional credit.

**793.08 Plastic and Reconstructive Surgery P 6, 12, 18**  
 1, 2, 3, or 4 months; offered all months.  
 Repeatable to a maximum of 24 cr. hrs. for professional credit.

**793.09 Thoracic Surgery P 6, 12, 18**  
 1, 2, or 3 months; offered all months.  
 Repeatable to a maximum of 18 cr. hrs. for professional credit.

**793.10 Peripheral Vascular Surgery P 6, 12, 18**  
 1, 2, or 3 months.  
 Prereq.: Completion of Med. Coll. 656 or equiv.  
 Limit: 2 students in any 1 month.  
 Repeatable to a maximum of 18 cr. hrs. for professional credit.  
 Clinical clerkship in peripheral vascular surgery.

**794**  
**Group Studies in Surgery**  
 Prereq.: Permission of instructor.  
**794.04 Emergency Room, Univ. Hosp. P 6**  
 1 month, offered all months.  
**794.05 Neurological Surgery P 6, 12, 18**  
 1, 2, or 3 months; offered all months except June.  
 Repeatable to a maximum of 18 cr. hrs.

**794.06 Clinical Orthopaedics** P 6, 12, 18  
1, 2, 3, or 4 months; offered all months.  
Repeatable to a maximum of 24 cr. hrs.

**794.07 Pediatric Surgery** P 6  
1 month, offered all months.

**794.08 Pediatric Surgery, Preceptorship** P 6 or 12  
2 months, offered all months.  
Must repeat to 12 cr. hrs.

**794.09 Plastic Surgery** P 6, 12, 18  
1, 2, or 3 months; offered all months except August and Oct.  
Repeatable to a maximum of 18 cr. hrs.

**794.10 Surgical Laboratory** P 6, 12, 18  
University Hospitals 1, 2, or 3 months; offered all months.  
Repeatable to a maximum of 18 cr. hrs.

**794.11 Thoracic Surgery** P 6  
1 month, offered all months except June.

**794.12 Thoracic Surgery-Cardiovascular** P 6  
1 months, offered all months.

**794.13 Urology** P 6  
1, 2, or 3 months; offered all months.

## 798 P 18

### Internship in Surgery

Su, A, W, Sp.  
Prereq.: Appointment as Intern, College of Medicine.  
Repeatable to a maximum of 72 cr. hrs.  
Broad exposure to surgical principles and practices one-half general surgery, one-half surgical specialties; experience in operating rooms, wards, and emergency room; rounds, conferences.

## 799 P 18

### Residency in Surgery

Su, A, W, Sp.  
12 months full time, beginning July 1.  
Prereq.: Appointment as Resident, College of Medicine.  
Repeatable to a maximum of 360 cr. hrs.  
Rotation through general surgery and surgical specialties rounds, and conferences.

## 850 G 3 or 5

### Seminar in Surgery

Su, A, W, Sp.  
Group and individual discussions of current surgical problems and their management; discussions of basic and applied topics. Zollinger and Staff.

## 999 G Arr.

### Research in Surgery

Su, A, W, Sp.  
Research for thesis purposes only.

# Theatre

Office: Drake Union, 1849 Cannon Drive

**Professors** Walker (Chairman), Bowen, Crepeau, Lewis, McDowell, and Ritter; **Associate Professors** Kabatchnik, McCray, Morrow, and Schreck (Emeritus); **Assistant Professors** Ayers, Glancy, Guillot, Hastings, and Kirk; **Instructor** Bergman.

## 100 U 5

### Introduction to Theatre

Su, A, W, Sp.  
Not open to students with credit for 165.  
A study of the theatre with emphasis upon its cultural and social influences in our society.

## 101 U 3

### Principles and Techniques of the Theatre Arts I

A. 1 2-hr. cl., 2 2-hr. labs.  
Prereq.: Permission of Chairman.  
Repeatable to a maximum of 6 cr. hrs.  
Basic principles and elementary techniques of theatrical performance.

## 102 U 3

### Principles and Techniques of the Theatre Arts II

W. 1 2-hr. cl., 2 2-hr. labs.  
Prereq.: 101.  
Continuation of 101.

## 103 U 3

### Principles and Techniques of the Theatre Arts III

Sp. 1 2-hr. cl., 2 2-hr. labs.  
Prereq.: 102.  
Continuation of 102.

## 200 U 3

### Fundamentals of Theatre Practice

Su, A, W, Sp. 3 cl.  
Not open to students with credit for 275.  
Nature of modern theatre art and principles of play production; survey of contemporary theatre and career opportunities.

## 205 U 1

### Theatre Practicum I

Su, A, W, Sp.  
Prereq.: Written permission of instructor.  
Repeatable to a maximum of 6 cr. hrs. including credit in 265.  
Provides experience in theatrical performance and production activities.

- 205.01 Stage Direction/Management
- 205.02 Technical Production/Lighting
- 205.04 Stage Design
- 205.05 Costuming/Makeup
- 205.08 Acting
- 205.09 Theatre Management

**220 U 5****Technical Production I**

Su, A, W, Sp.

Prereq.: 200.

Not open to students with credit for 270.

Basic aspects of scenery construction, rigging, stage lighting, and sound effects, and their integration.

**271 U 5****Great Ages of the Theatre**

Su, A, W, Sp. 5 cl.

Not open to students with credit for 285.

Concepts and characteristics of the great periods of the theatre of the Western World.

**280 U 3****Acting Fundamentals I**

Su, A, W, Sp. 2 2-hr. cl.

Prereq.: 200.

The actor's resources and methods, basic body movement, and vocal interpretation.

**281 U 3****Acting Fundamentals II**

A, W, Sp. 2 2-hr. cl.

Prereq.: 280 or equiv.

Not open to students with credit for 365.

Scene study and development of technical acting skills.

**284 U 2****Stage Movement I**

A, W, Sp.

Prereq.: Admission to Theatre B.F.A. program.

Repeatable to a maximum of 6 cr. hrs.

The LeCoq technique of movement training: physical conditioning, kinesthetic awareness, stage combat, mask technique, improvisations and scene work; specifically designed for beginning professional students.

**286 U 2****Stage Speech I**

A, W, Sp. 5 cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 6 cr. hrs.

Basic training in stage speech for acting and directing.

**310 U 5****Stage Directing I**

Su, A. 3 2-hr. cl.

Not open to students with credit for 365.

Techniques of play analysis, interpretation, composition, movement, rhythm, and tempo; their integration in stage direction.

**320 U 3****Stage Management**

A. 2 cl., 1 lab. hr. arr.

Prereq.: 220 or equiv.

Research, discussion, and application of the principles of organizing and managing stage productions; experience in actual performance.

**325 U 3****Stage Lighting I**

A. 3 cl.

Prereq.: 220 or equiv.

Not open to students with credit for 530.

Study of electrical, mechanical, and electronic elements of lighting for the stage as prerequisite for the study of stage lighting design.

**341 U 3****Stage Design Drafting**

A. 2 2-hr. labs.

Prereq.: 220.

Not open to students with credit for 340 or 540.

Principles of mechanical drawing and scale model building as applied to the problems of theatrical scene design.

**350 U 2****Introduction to Stage Makeup**

Su, A, W, Sp. 2 cl.

Prereq.: 200 or permission of instructor.

Practical application of the theories and techniques of theatrical makeup.

**351 U 3****Stage Costuming I**

A, Sp. 3 cl.

Prereq.: 200.

Not open to students with credit for 366.

Basic principles and techniques of stage costume design and construction.

**380 U 3****Intermediate Acting I**

Su, A, W. 2 2-hr. cl.

Prereq.: 281 or equiv. and written permission of instructor.

**381 U 3****Intermediate Acting II**

Su, A, W, Sp. 2 2-hr. cl.

Prereq.: 380 and written permission of instructor.

**405 U 1-3****Theatre Practicum II**

Su, A, W, Sp.

Prereq.: Written permission of instructor.

Repeatable to a maximum of 18 cr. hrs. in any combination of decimal subdivisions.

Provides experience in theatrical performance and production activities at an intermediate level.

**405.01 Stage Direction/Management****405.02 Technical Production/Lighting****405.04 Stage Design****405.05 Costuming/Makeup****405.08 Acting****405.09 Theatre Management**

**501 U G 5****Children's Theatre: Production and Direction**

Su, A, W, Sp. 5 cl.

Prereq.: 220.

Not open to students with credit for 565.

Selection, production, and direction of plays for children.

**510 U G 5****Stage Directing II**

W. 4 cl.

Prereq.: 310.

Analysis of staging problems in scenes from selected modern dramas; techniques for staging.

**520 U G 3****Technical Production II**

W. 3 cl.

Prereq.: 320 and 341.

Staging methods in non-typical scenic styles and periods for dramatic and musical productions.

**531 U G 3****Theatre Repertory I**

A. 3 cl.

Not open to students with credit for 571.

Survey of representative realistic plays in the repertory of modern Western theatre.

**532 U G 3****Theatre Repertory II**

W. 3 cl.

Not open to students with credit for 572.

Survey of representative non-realistic plays in the repertory of modern Western theatre.

**533 U G 3****Theatre Repertory III**

Sp. 3 cl.

Not open to students with credit for 573.

Survey of representative classical and romantic works in the repertory of the Western theatre.

**545 U G 3****Introduction to Stage Design**

W. 3 cl.

Prereq.: 341.

Not open to students with credit for 540.

Fundamental principles and techniques of stage design; experience in designing projects.

**601 U G 3****Theatre Management**

A.

Prereq.: 320 or permission of instructor.

Consideration of principles of management as applied to theatre production, preparation, and performance.

**610 U G 5****Advanced Stage Directing**

A. 3 2-hr. cl.

Prereq.: 510 or permission of instructor.

Not open to students with credit for 865.

Principles, techniques, and practice of advanced direction and integration of technical elements in theatrical production.

**620 U G 3****Technical Production III**

Sp.

Prereq.: 520 or equiv.

Consideration and application of methods and materials for construction of properties and special effects for the stage.

**625 U G 3****Stage Lighting II**

W.

Prereq.: 325 or equiv.

Study of light as a design medium for the stage; preparation of lighting designs for various stages.

**626 U G 2****Theatre Sound Techniques**

Sp.

Prereq.: 625.

A survey of equipment and operational techniques used to provide sound support for theatrical productions.

**640 U G 3****Decorative Arts for Theatre**

A.

Prereq.: 545 or equiv.

Condensed survey of decorative arts, ancient to modern; emphasis on interiors, furniture, textiles, and colors and their adaptation to stage use.

**641 U G 3****Stage Design Media**

W.

Prereq.: 545 or equiv.

Techniques of rendering for stage design in various media.

**642 U G 3****Scene Painting and Watercolor**

Sp.

Prereq.: 545.

Repeatable to a maximum of 6 cr. hrs.

Techniques used in scene painting and watercolor; mixing and matching colors, rendering texture and form, enlarging painter's elevations; types of paints used in scene painting.

**645 U G 3****Modern Stage Design Styles**

Sp. 3 cl.

Prereq.: 545 or permission of instructor.

Study of the application of major stylistic trends in scenic design to modern theatrical productions through lecture-discussion and specific design projects.

**650 U G 2****Advanced Stage Makeup**

W. 2 cl.

Prereq.: 350.

Advanced theories and techniques of theatrical makeup with emphasis on problems in modern theatre styles.

**651 U G 3****Stage Costuming II**

W.

Prereq.: 351 or equiv.

Principles and methods of pattern drafting, cutting, draping, and construction of stage costume.

**655 U G 5****History of Stage Costume**

A. 3 cl.

Comprehensive survey of western dress from Egyptian to modern, with emphasis on construction details and theatrical application.

**660 U G 5****Playwriting I**

W.

Prereq.: Basic knowledge of dramatic literature and permission of instructor.

Repeatable to a maximum of 10 cr. hrs. including credit for Engl. 667.

Laboratory course in playwriting; student plays developed from original idea through scenario into final production script with limited production of selected works.

**671 U G 3****History of the Theatre I**

A. 3 cl.

Greek, Roman, Medieval, and Commedia dell'arte theatre.

**672 U G 3****History of the Theatre II**

Su, W. 3 cl.

Renaissance, Elizabethan, and Restoration theatre.

**673 U G 3****History of the Theatre III**

Sp. 3 cl.

18th and 19th century Continental, English, and American theatre.

**674 U G 3****History of the Theatre IV**

A.

20th Century Continental, English, and American theatre.

**675 U G 5****American Theatre History**

W. 5 cl.

Prereq.: Permission of instructor.

Development of the American theatre from 1752 to the present; consideration of principal actors, managers, playwrights, directors, and designers.

**680 U G 3****Acting in Period Drama I**

W. 2 2-hr. cl.

Prereq.: 381 or equiv.

Not open to students with credit for 605.

Textual and character analysis, vocal and physical skills requisite for the acting of selected period drama.

**681 U G 3****Acting in Period Drama II**

Sp.

Prereq.: 680.

Continuation of 680.

**688 U G 2****Stage Movement II**

A, W, Sp.

Prereq.: Permission of instructor.

Not open to students with credit for 284.

Repeatable to a maximum of 6 cr. hrs.

The LeCoq technique of movement training: physical conditioning, kinesthetic awareness, stage combat, mask technique, improvisations and scene work.

**693 U G 1-5****Individual Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Conference, library, and laboratory work.

**694 U G 3 or 5****Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

**698† U G 3-15****Study Tour**

Su, A.

Prereq.: Permission of instructor.

**711 U G 5****Comparative Study in Film and Theatre Directing**

A. 2 2-hr. cl.

Prereq.: 310, 510 and Photog. and Cinma. 505 and 551.

An analytical and descriptive study of the nature and differences of film and theatre directing.

**745 U G 3****Advanced Scene Design**

A, W, Sp.

Prereq.: 645 or equiv. and permission of instructor.

Repeatable to a maximum of 9 cr. hrs.

Study of historic and modern scene design and application to modern theatrical stage practices; experience in executing creative and interpretive project designs.

**751 U G 3****Stage Costuming Accessories**

Sp.

Prereq.: 651 or equiv.

Methods of design and construction for costume foundations (corsets, hoops, padding, etc.), headgear, hats, footwear, jewelry, and armor.

**755 U G 3****Stage Costume Design**

W. 3 cl.

Prereq.: 651 and 655 or equiv.

Theory, methods, and materials of costume design with emphasis on design problems for the stage. Chappell.

**760 U G 3****Theatre Styles**

A. 3 cl.

Prereq.: 510 or permission of instructor.

Not open to students with credit for 770.

Study and analysis of significant styles of production in the theatre.

**761 U G 5****Theatrical Criticism**

A. 5 cl.

Prereq.: Grad. standing or permission of instructor.

Not open to students with credit for 875.

Critical theories from the Greek to the modern period with particular reference to the influence of the theorists, church, state, and press.

**771†\* U G 3****Greek and Roman Theatre**

A.

Prereq.: 671 or equiv.

Advanced study and research in Greek and Roman theatre and drama.

**772†\* U G 3****European Renaissance Theatre**

W.

Prereq.: 671 and 672 or equivs.

Advanced study and research in Renaissance theatre and drama on the continent.

**773†\* U G 3****English Renaissance Theatre**

Sp.

Prereq.: 671, 672, and 673, or equivs.

Examination of theatre history and drama of 16th- and 17th-century England up to 1642.

**774 U G 3****Restoration and 18th-Century Theatre**

W.

Prereq.: 671, 672, and 673, or equivs.

Advanced study and research in English theatre and drama of the Restoration and 18th century.

**775\* U G 3****European Baroque Theatre**

W.

Prereq.: 671, 672, and 673 or equivs.

Advanced study and research in Baroque theatre and drama in Europe.

**776\* U G 3****Nineteenth Century European Theatre**

Sp.

Prereq.: 671, 672, and 673 or equivs.

Analysis of the rise of naturalism and realism in the drama and theatre of England and the continent during the 19th century.

**780 U G 3****Advanced Acting Theory**

A.

Prereq.: Permission of instructor.

A study of the major theories of the art of acting and their application.

**H783 U 3-5****Honors Course**

Su, A, W, Sp.

Prereq.: 4th yr. standing; a grade of A in at least half of the Thtr. courses taken and an average of B in the remainder; permission of instructor under whose supervision the work is to be completed and the Arts and Sciences Honors Committee.

Failure to receive a mark of S in this course is a disqualification for special honors.

Repeatable to a maximum of 15 cr. hrs.

An individual program of study, with conferences, reports, and Honors thesis.

**786 U G 2****Stage Speech II**

A, W, Sp. 4 1-hr. labs.

Repeatable to a maximum of 6 cr. hrs.

Advanced study of voice; phonetics; development of special vocal techniques required for stage performance.

**789 U G 2****Advanced Acting Studio**

A, W, Sp.

Repeatable to a maximum of 12 cr. hrs.

**800 G 3 or 5****Advanced Studies in Theatre**

Su, A, W, Sp.

Repeatable to a maximum of 40 cr. hrs. including cr. hrs. earned in 880.

**800.01 Stage Direction/Management**

**800.02 Technical Production/Lighting**

**800.03 Dramatic Literature**

**800.04 Stage Design**

**800.05 Costuming/Makeup**

**800.06 Criticism, Theory, Playwriting**

**800.07 History**

**800.08 Acting**

**800.09 Theatre Management**

**801 G 5****Research Methods**

A. 2 2-hr. cl., lab. arr.

Not open to students with credit for 870.

Methods and tools of research in all areas of theatre.



**802 G 2-5****Seminars in Theatre**

Su, A, W, Sp.

Repeatable to a maximum of 40 cr. hrs. in any combination of decimal subdivisions including cr. hrs. earned in 970.

- 802.01 Stage Direction/Management**
- 802.02 Technical Production/Lighting**
- 802.03 Dramatic Literature**
- 802.04 Stage Design**
- 802.05 Costuming/Makeup**
- 802.06 Criticism, Theory, Playwriting**
- 802.07 History**
- 802.08 Acting**
- 802.09 Theatre Management**

**805 G 1-5****Graduate Theatre Practicum**

Su, A, W, Sp.

Prereq.: Permission of adviser.

Repeatable to a maximum of 40 cr. hrs. in any combination of decimal subdivisions including cr. hrs. earned in 880p.

Individual theatrical performance and production activities at an advanced level under faculty supervision.

- 805.01 Stage Direction/Management**
- 805.02 Technical Production/Lighting**
- 805.04 Stage Design**
- 805.05 Costuming/Makeup**
- 805.08 Acting**
- 805.09 Theatre Management**

**810 G 3****Directing Period Drama**

W.

Prereq.: 671, 672, 673, and 760 or equivs.; 680 and 681 recommended.

Advanced problems in directing premodern drama.

**811 G 3****Directing in Modern Theatre Styles**

Sp.

Prereq.: 610, 674, and 760 or equivs.

Advanced problems in directing modern nonrealistic styles of drama.

**830 G 3****Comparative Comedy**

A. 3 cl.

Prereq.: 531, 532, and 533 or equivs.

Not open to students with credit for 685.

Variation in the form of the comic genre from Greek farce to contemporary comedy.

**831 G 3****Comparative Tragedy**

Sp. 3 cl.

Prereq.: 531, 532, and 533 or equivs.

Not open to students with credit for 686.

Variations in the form of the tragic genre from Aeschylus to the present.

**832† G 3****Comparative Melodrama**

Sp. 3 cl.

Prereq.: 531, 532, and 533 or equivs.

Variations in the melodramatic form from Euripides to the present.

**833 G 5****Seminal Modern Drama**

A. 5 cl.

Not open to students with credit for 871.

Consideration of modern dramatists who have most influenced the content and the technique of contemporary drama.

**834 G 5****Contemporary Drama**

W. 5 cl.

Consideration of the most significant post-World War II dramatists.

**860 G 5****Classical Critical Theories of the Theatre**

W. 5 cl.

Prereq.: 761 or permission of instructor.

Not open to students with credit for 876.

Detailed analysis of the classical sources of critical theory of the theatre.

**861 G 5****Modern Critical Theories of the Theatre**

Sp. 2 2-hr. cl.

Prereq.: 761 or permission of instructor.

Not open to students with credit for 877.

Concentrated analysis and discussion of recent critical theories of the theatre, especially since 1945; examination of pivotal books in the field.

**990† G 3-15****International Theatre Research**

A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Individual research in drama and theatre on campus and abroad.

**993 G 3-5****Individual Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

**998 G 1-6****Research in Theatre: Thesis**

Su, A, W, Sp.

Repeatable to a maximum of 6 cr. hrs.

Research for thesis purposes only.

**999 G. Arr.****Research in Theatre: Dissertation**

Su, A, W, Sp.

Research for dissertation purposes only.

## University College

100 U 1

### Freshman Survey

Su, A, W, Sp. 2 1-hr. cl.

Prereq.: Enrollment in University College.

Academic requirements and organization of the University, nature of scholarly study, characteristics of academically successful students, study techniques, selection of degree programs, academic coping skills.

(Students schedule a section of Freshman Survey corresponding to their curricular academic program.)

- 100.01 Administrative Science Survey
- 100.03 Agriculture Survey
- 100.05 Allied Medical Professions Survey
- 100.07 Architecture Survey
- 100.09 Art Survey
- 100.11 Arts and Sciences Survey
- 100.13 Dentistry Survey
- 100.15 Dental Hygiene Survey
- 100.17 Education Survey
- 100.19 Engineering Survey
- 100.21 General Baccalaureate Survey
- 100.23 Home Economics Survey
- 100.25 Medicine Survey
- 100.27 Music Survey
- 100.29 Nursing Survey
- 100.31 Optometry Survey
- 100.33 Pharmacy Survey
- 100.35 Social Work Survey
- 100.37 Veterinary Medicine Survey

## Veterinary Anatomy

Office: 102-A Sisson Hall, 1900 Coffey Road

Professors Venzke (Chairman), deWet, Diesem, and Horowitz; Associate Professor Scothorn; Assistant Professors Hunter and Rowland.

100 U 5

### Veterinary Anatomy

A. 5 cl.

Prereq.: Zool. 201 or equiv.

Not open to Vet. Med. Students.

Lectures and demonstrations on specimens from the various anatomical systems of domestic animals.

601 P G 3-5

### Veterinary Endocrinology

Su, A, W, Sp. 3 cl., 4 lab. hrs.

Prereq.: Vet. Med., Coll. of 604 or equiv.

Special consideration is given to correlation of endocrine control of cellular metabolism. Venzke.

693 P G 2-5

### Individual Studies

Su, A, W, Sp. 1 cl., 6-15 lab. hrs.

Prereq.: Vet. Med., Coll. of 530 and 531.

Repeatable to a maximum of 18 cr. hrs.

Training in laboratory investigation of special problems. Venzke, Diesem, and deWet.

700 P G 6

### Comparative Functional Neuroanatomy

Su, A, W, Sp. 3 cl., 6 lab. hrs.

Prereq.: Vet. Med., Coll. of 603, Anat. 817, or equiv.

A detailed comparative gross and microscopic study of the external and internal structure of the central nervous systems and sense and effector organs and their organization into functional divisions in infra-primates (domestic mammals and fowl) and primates. deWet.

794 P G 2-6

### Group Studies in Veterinary Anatomy

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 24 cr. hrs. for prof. cr. and 2-8 cr. hrs. for grad. cr.

Provides flexibility in the veterinary professional program by offering selected topics in Veterinary Anatomy.

#### 794.01 Equine Surgical Anatomy

Emphasis on blood and nerve supply to common surgical sites; special emphasis involving methods of anesthetizing selected surgical areas and areas useful in diagnostic procedures for lameness. Diesem.

#### 794.02 Ophthalmic Anatomy

The comparative anatomy, histology, neuroanatomy, and embryology of the orbit and its contents in mammals, birds, and reptiles. Diesem.

#### 794.03 Gross Anatomy, Birds, and Rodents

Gross anatomical dissection of common birds and rodents. Diesem and Venzke.

#### 794.04 Comparative Developmental Anatomy

Stresses the comparative development of the embryos of domestic animals, the fetal membranes and anomalies. Venzke.

#### 794.05 Microscopic Anatomy

Comprehensive investigation of basic tissue groups; involving the light microscopic examination of tissues within the selected group; and current literature reviews, in addition to lectures, demonstrations, and discussion. Rowland.

#### 794.06 Histology

Comprehensive investigation of selected areas of histology of particular interest to the student, involving laboratory work, lectures, and discussions. Rowland.

#### 794.07 General Histopathology Techniques

Gives the student a basic understanding of the preparation of biological material for light microscopy; laboratory experience includes the standard techniques of fixation, embedding, sectioning, staining, mounting, and viewing of biological material. Rowland.

#### 794.08 General Embryological Techniques

Provides a basic understanding of the methods of preparation of embryos for investigations in developmental anatomy and teratology; laboratory experience will be required in all phases of preparations including fixation, embedding, sectioning, and staining. Venzke.

**794.09 Ultrastructural Anatomy**

Provides a basic understanding of the cell and its organelles as they relate to function and permits experience in the preparation of biological materials for electron microscopy; limited use of the electron microscope. Rowland.

**801 G 2-5****Anatomical Techniques**

Su. 1 cl., 6-15 lab. hrs.

Prereq.: Vet. Med., Coll. of 521, 531 or equiv. and permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Theory and practice of macroscopic and microscopic methods, including specimen preparation for dissection, fixing, imbedding, sectioning, mounting, and staining of animal tissue. Diesem, Venzke, and deWet.

**810 G 3-5****Anatomy of Laboratory Animals**

Su. 3-5 cl., 2 hrs. each.

Prereq.: Vet. Med., Coll. of 610, Vet. Clin. Sci. 651, or equiv. and permission of instructor.

Open by special permission to students who have not specialized in Vet. Med.

Anatomy of laboratory animals, including primates, rodents, and avian species; emphasis on application of anatomy to surgical procedures and research techniques. Diesem.

**999 G Arr.****Research in Veterinary Anatomy**

Su, A, W, Sp.

Research for thesis or dissertation purposes only.

A study of the diseases of laboratory animals (primates, rabbits) with emphasis on management, diagnosis, and treatment. Webster and Stilson.

**710 P 4****Applied Veterinary Medicine Options**

Su, A, W, Sp.

Prereq.: Vet. Med. 4th yr. standing.

Repeatable to a maximum of 8 cr. hrs.

A series of clinical studies offered as electives for 4th year Vet. Med. students to arrange into an elective program in conjunction with a faculty adviser.

**710.01 Receiving/Out-Patient Clinic**

Clinical instruction designed to improve the student's proficiency in client relations, diagnosis, treatment, and prevention of diseases in out-patients.

**710.02 Companion Animal Medicine**

The application to companion animal patients of the latest knowledge concerning diagnosis, treatment, and prevention of diseases.

**710.03 Small Animal Surgery**

The application of principles of surgery to treatment of diseases of companion animals.

**710.04 Large Animal Medicine**

Clinical instruction and experience in the diagnosis, treatment, and prevention of diseases of horses, cattle, swine, and sheep.

**710.05 Large Animal Surgery**

The application of principles of surgery to treatment of diseases of farm and other large species of animals.

**710.06 Ambulatory Clinic**

The application of the principles of management, diagnosis, treatment, and prevention of disease in farm and exotic animals in the environment in which they are produced.

**710.07 Veterinary Clinical Radiology**

Diagnostic and therapeutic techniques that will broaden the student's knowledge in clinical diagnosis and treatment.

**Veterinary Clinical Sciences**

Office: 1009 Veterinary Clinic, 2578 Kenny Road

**Professors** Murdick (Acting Chairman), Krill (Emeritus), Andreas, Dennis, Donham, Donovan, Gabel, Johnson, Rhein, Rudy, Sharp, Venzke, Wearly, Wilson, and Whiteus; **Associate Professors** Capen, Fetter, Gardner, Heider, Hohn, Ray, and Wyman; **Assistant Professors** Bell, Burt, Carlson, Hathaway, Hilwig, Hoffsis, Kociba, Stilson, and Wilson; **Instructors** Chrisman, Doherty, Miller, Paul, Wallace, Webster, Wigton, and Wright.

**670 P G 5****Laboratory Animal Medicine**

A. 3 cl., 3 2-hr. lab.

Prereq.: D.V.M. or permission of instructor.

Not open to students with credit for Vet. Med. 620.

A study of the diseases of laboratory animals with emphasis on colony management, diagnosis, and treatment. Webster and Stilson.

**671 P G 5****Laboratory Animal Medicine**

W. 3 cl., 3 2-hr. lab.

Prereq.: 670, D.V.M., or permission of instructor.

Not open to students with credit for Vet. Med. 621.

**750 P 3****Veterinary Practice and Hospital Management**

Su, A, W, Sp.

Prereq.: Vet. Med. 3rd or 4th yr. standing.

Basic principles of hospital and practice management including insurance, partnerships, corporations, accounting, taxes, employees, and general management procedures. Whiteus.

**760 P G 3****Comparative Ophthalmology**

Sp.

Prereq.: Permission of Instructor

The comprehensive consideration of comparative ophthalmology in which differences and similarities of eyes in domestic animals will be presented.

**793 P G 2-8****Individual Studies**

Su, A, W, Sp.

Prereq.: Vet. Med. 4th yr. standing, adequate clinical training and permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

A supervised critical investigation of some aspects of animal disease about which there is a mutual curiosity on the part of both the student and faculty.

794

P G 1-8

**Group Studies in Veterinary Clinical Sciences**

Su, A, W, Sp.

Prereq.: Vet. Med. 3rd or 4th yr. standing or permission of instructor.

Repeatable to a maximum of 30 cr. hrs.

**794.01 Advanced Canine and Feline Medicine**

Special consideration will be given to applying the knowledge gained in the core curriculum to special diseases of the organ systems of the dog and cat.

**794.02 Advanced Canine and Feline General Surgery**

Designed to increase the student's knowledge and skills necessary for the diagnosis and surgical treatment of diseases of dogs and cats.

**794.03 Equine Medicine and Surgery**

Current concepts of diagnosis, treatment, and prevention of diseases of horses presented in conferences and demonstrations.

**794.04 Bovine and Ovine Medicine Surgery**

Current concepts of diagnosis, treatment, and prevention of diseases of ruminants presented in conferences and demonstrations.

**794.05 Swine Medicine and Surgery**

Current concepts of diagnosis, treatment, and prevention of important diseases of swine presented in conferences and demonstrations.

**794.06 Avian Diseases**

Prevention, diagnosis, and treatment of diseases of poultry, game birds, and caged pet birds or zoologic specimens.

**794.07 Laboratory Medicine**

Assignment of patients for in-depth independent study of diagnosis and disease course with emphasis on the laboratory parameters, their selection and interpretation.

**794.08 Clinical Microbiology**

Assignment of patients for in-depth study of diagnosis and course of disease with emphasis on selection and interpretation of laboratory parameters.

**794.09 Special Diagnostic Radiography**

Special techniques including contrast studies, fluoroscopy, catheterization procedures, and special positioning techniques.

**794.10 Therapeutic Radiology**

Dosimetry, tissue susceptibility, and reactions to radiation applied to clinical patients with neoplasia or chronic inflammation.

**794.11 Advanced Nuclear Medicine**

Application of radioisotopes in diagnostic or therapeutic procedures.

**794.12 Veterinary Ophthalmology—Disease of the Eye**

Discussion of disease recognition, pathophysiology, diagnosis, and therapy, both medical and surgical; a laboratory for surgical procedures will be conducted.

**794.13 Advanced Physiology of Reproduction and Diseases of the Reproductive System**

The advanced study of all aspects of mammalian reproduction.

**794.14 Advanced Cardiology**

Advanced study of the diagnosis, treatment, and prevention of diseases of the cardiovascular system.

**794.15 Advanced Thoracic Surgery**

Consideration of advanced surgical techniques for treatment of diseases of the thorax requiring surgery.

**794.16 Advanced Neurology**

Advanced study of diagnosis, treatment, and prevention of diseases affecting the nervous system.

**794.17 Advanced Neurosurgery**

Practical application of advanced surgical techniques for treatment of diseases of the nervous system requiring surgery.

**794.18 Advanced Orthopedic Surgery of Companion Animals**

Practical application of advanced surgical techniques for treatment of disease of the skeletal system requiring surgery.

**794.19 Advanced Orthopedic Surgery of Equine**

Practical application of advanced surgical techniques for treatment of diseases of the skeletal system requiring surgery.

**794.20 Advanced Equine Lameness**

Study of the methods used for diagnosis and treatment of diseases causing lameness in horses; includes radiographic and surgical techniques.

**794.21 Diseases of Hemic and Lymphatic Systems**

Clinical care and laboratory studies of patients with hematologic disorders.

**794.22 Advanced Dermatology**

Studies of diagnosis, treatment, and prevention of diseases of the skin; emphasis on definitive diagnostic techniques, therapy, and patient care.

**794.23 Advanced Gastroenterology**

Study of diagnosis, treatment, and prevention of diseases of the gastrointestinal system.

**794.24 Advanced Urology**

Study of diagnosis, treatment, and prevention of disease of the urinary system.

**794.25 Advanced Study of Diseases of the Respiratory System**

Study of diagnosis, treatment, and prevention of diseases of the respiratory system.

**794.26 Advanced Study of Diseases of the Endocrine System and Metabolic Diseases**

Study of diagnosis, treatment, and prevention of diseases of the endocrine system and metabolic diseases.

**794.27 Advanced Clinical Pharmacology and Toxicology**

Conferences, demonstrations, and clinical patients will be used to study basic and applied pharmacology; study of the action, metabolism, and excretion of drugs.

**794.28 Physiological Basis of Clinical Dietetics**

Composition and energy content of feedstuffs, respiratory quotient, calometric measurement, BMR and effect of age, species, sex, body weight, body size, and specific dynamic action of feedstuffs.

**794.29 Nutrient Requirements and Modern Nutritional Practice in Domestic Animals**

Nutritional requirements and practices in the dog, cat, equine, dairy cow, beef cow, swine, poultry, and laboratory and exotic animals.

**794.30 General Medical Considerations in Clinical Dietetics**

Calories, nutrition and infection, inherited metabolic deficiencies, food intolerances among species, parenteral nutrition in surgical and medical diseases, the role of prescription diets in the prevention and treatment of disease.

**794.31 Laboratory Animal Medicine**

Presentation of the basic principles of care and biology of rodents, rabbits, and other exotic pets and the prevention, recognition, and treatment of diseases.

**794.32 Primatology**

The basic principles of the care and biology of nonhuman primates and the prevention, recognition, and treatment of their common diseases.

**798 P 18**

**Residency in Veterinary Clinical Sciences**

Su, A, W, Sp.

12 months full-time, beginning July 1.

Prereq.: Appointment as Resident, University Veterinary Hospital.

Repeatable to a maximum of 216 cr. hrs.

**798.01 Residency in Veterinary Surgery**

Rotation through general surgery and sub-specialties; rounds, conferences, and seminars.

**798.02 Residency in Veterinary Radiology**

General diagnostic radiology, radiation therapy, nuclear medicine, special diagnostic and therapeutic procedures, conferences, and seminars.

**798.03 Residency in Veterinary Ophthalmology**

Rotation through medicine and surgery of the eye and adnexa of all animal species; rounds, seminars, conferences, and didactic programs.

**798.04 Residency in Veterinary Medicine**

Rotation through general medicine and medical sub-specialties; rounds, conferences, seminars, and didactic programs.

**999 G Arr.**

**Research in Veterinary Clinical Sciences**

Su, A, W, Sp.

Research for thesis or dissertation purposes only.

**530 P 5**

**Comparative Structure and Function of Tissues**

A.

Prereq.: Vet. Med. 1st yr. standing.

The interdisciplinary study of tissue structure and development of the four tissue classes, involving concepts of embryology, histology, endocrinology, and physiology. Venzke.

**531 P 3**

**Comparative Structure and Function of Tissues**

W.

Prereq.: Vet. Med. 1st yr. standing.

Continuation of 530. Rowland.

**540 P 4**

**Comparative Cellular Biology**

A.

Prereq.: Vet. Med. 1st yr. standing.

Introduction to principles of structure, function, and malfunction at the cellular level, including enzymes, energetics, metabolism, and growth. Nagode.

**550 P 11**

**Comparative Biology of Disease**

W.

Prereq.: Vet. Med. 1st yr. standing.

An interdisciplinary study of the interactions between disease producing agents, body systems, tissues, cells, subcellular units, and selected drugs. Shaddock.

**560 P 2**

**Basic Elements of Veterinary Medical Practice and Hospital Orientation I**

A.

Prereq.: Vet. Med. 1st yr. standing.

The identification of disease via history, physical, and laboratory examinations and special diagnostic techniques and orientation in therapeutic procedures in a hospital environment.

**561 P 3**

**Basic Elements of Veterinary Medical Practice and Hospital Orientation II**

W.

Prereq.: Vet. Med. 1st yr. standing.

Continuation of 560.

**562 P 2**

**Basic Elements of Veterinary Medical Practice and Hospital Orientation III**

Sp.

Prereq.: Vet. Med. 1st yr. standing.

Continuation of 561.

**563 P 2**

**Basic Elements of Veterinary Medical Practice and Hospital Orientation IV**

A.

Prereq.: Vet. Med. 2nd yr. standing.

Continuation of 562.

# **Veterinary Medicine, College of**

Office: 101A Sisson Hall, 1900 Coffey Road

**510 P 4**

**Animals and Their Environments**

A.

Prereq.: Vet. Med. 1st yr. standing.

Consideration of the composition of the whole animal body, the internal and external environments, homeostasis, biological variation and measurement, and animal behavior. Powers.

**520 P 6**

**Comparative Topographic Anatomy**

A.

Prereq.: Vet. Med. 1st yr. standing.

The dynamic comparative study of the form, relationship, and mechanical functioning of component body parts as they relate to modern veterinary medicine. Diesem.

**521 P 4**

**Comparative Topographic Anatomy**

W.

Prereq.: Vet. Med. 1st yr. standing.

Continuation of 520. Diesem.

**564 P 2**  
**Basic Elements of Veterinary Medical Practice and Hospital Orientation V**

W.  
 Prereq.: Vet. Med. 2nd yr. standing.  
 Continuation of 563.

**600 P 6**  
**The Cardiovascular System**

A.  
 Prereq.: Vet. Med. 2nd yr. standing.  
 A comparative study of the structure, function, and dysfunction of the cardiovascular system including arrhythmias, abnormal flow, congenital disease, etiologic agents, diagnostic methods, and therapeutic approaches. Bishop.

**601 P 6**  
**The Respiratory System**

A.  
 Prereq.: Vet. Med. 2nd yr. standing.  
 A comparative study of the structure, function, and dysfunction of the respiratory system including reaction to injury, ventilation defects, pneumonias, neoplastic disease, radiological diagnosis, and therapeutic approaches. Farrell.

**602 P 6**  
**The Urinary System**

A.  
 Prereq.: Vet. Med. 2nd yr. standing.  
 A comparative study of the structure, function, and dysfunction of the urinary system including diseases of the kidney, bladder, and urethra, and their diagnosis and treatment. Powers.

**603 P 12**  
**The Nervous System**

Sp.  
 Prereq.: Vet. Med. 1st yr. standing.  
 A comparative study of the structure, function, and dysfunction of the nervous system including the pathogenesis, pathophysiology, diagnosis, prevention, and treatment of nervous system diseases. Koestner.

**604 P 5**  
**The Endocrine System**

Sp.  
 Prereq.: Vet. Med. 1st yr. standing.  
 A comparative study of the structures, function and dysfunction of the endocrine system including diseases of each endocrine organ and their relationships to whole body functions. Capen.

**605 P II**  
**The Reproductive System**

W.  
 Prereq.: Vet. Med. 2nd yr. standing.  
 A comparative study of the structure, function, and dysfunction of the reproductive system including etiologic, pathogenic, pathophysiologic, therapeutic, and preventive aspects of reproductive diseases. Murdick.

**606 P 7**  
**The Integumentary System**

Sp.  
 Prereq.: Vet. Med. 3rd yr. standing.  
 A comparative study of the structure, function, and dysfunction of the integumentary system including important infectious and parasitic diseases, diagnosis, treatment, and prevention. Wilson.

**607 P 10**  
**The Musculoskeletal System**

Sp.  
 Prereq.: Vet. Med. 2nd yr. standing.  
 A comparative study of the structure, function, and dysfunction of the musculoskeletal system including congenital, and acquired diseases, their radiographic diagnosis, treatment, and prevention. Hohn.

**608 P 3**  
**The Hemic-Lymphatic System**

Sp.  
 Prereq.: Vet. Med. 1st yr. standing.  
 A study of basic principles of the hemic-lymphatic system with emphasis on structure and function.

**609 P 10**  
**Digestive System**

Sp.  
 Prereq.: Vet. Med. 2nd yr. standing.  
 A comparative study of the structure, function, and dysfunction of the digestive system including relevant physiology, pathology, pharmacology, microbiology, parasitology, medicine, surgery, and preventive medicine. Smith.

**611 P 5**  
**Preventive Medicine and Public Health**

A.  
 Prereq.: Vet. Med. 3rd yr. standing.  
 The structure of public programs and the role of comparative medicine in health maintenance and disease prevention in animals, including man.

**618 P 5**  
**The Hemic-Lymphatic System**

W.  
 Prereq.: Vet. Med. 608 and 2nd yr. standing.  
 A comparative study of the hemic-lymphatic system with emphasis on dysfunction immunologic diseases diagnosis, treatment and prevention of hemopoietic disease; continuation of 608.

**619 P 6**  
**Applied Veterinary Medicine (Clinical Experience)**

Su. 7 days 24-hr. lab. duty, 1 cl.  
 Prereq.: 4th yr. standing in Vet. Med.  
 Intense training in clinical work for one term.

**620 P 10**  
**Applied Veterinary Medicine—Surgery**

A, W, Sp.  
 Prereq.: Vet. Med. 3rd yr. standing.  
 Clinical instruction in each of the surgery services with emphasis on practical experiences.

621 P 10

**Applied Veterinary Medicine—Medicine**

A, W, Sp.

Prereq.: Vet. Med. 3rd yr. standing.

Clinical instruction in each of the medical and preventive medicine services with emphasis on practical experiences.

622 P 10

**Applied Veterinary Medicine—Diagnostic Laboratory Medicine**

A, W, Sp.

Prereq.: Vet. Med. 3rd yr. standing.

Clinical instruction in each of the diagnostic laboratory services with emphasis on practical experiences.

700 P 4

**Applied Veterinary Medicine**

Su, A, W, Sp.

Prereq.: Vet. Med. 4th yr. standing

Repeatable to a maximum of 32 cr. hrs.

A series of clinical studies offered fourth-year veterinary medical students as part of the core curriculum.

**700.01 Receiving/Out-Patient Clinic**

Clinical instruction in client relations, diagnosis, treatment, and prevention of diseases in out-patients.

**700.02 Small Animal Medicine**

The application to small animal patients of the latest knowledge concerning diagnosis, treatment, and prevention of diseases.

**700.03 Small Animal Surgery**

The application of principles of surgery to treatment of diseases of companion small animals.

**700.04 Large Animal Medicine**

Clinical instruction and experience in the diagnosis, treatment, and prevention of diseases of horses, cattle, swine, and sheep.

**700.05 Large Animal Surgery**

The application of principles of surgery to treatment of diseases of farm and other large species of animals.

**700.06 Ambulatory Clinics**

The application of the principles of management, diagnosis, treatment, and prevention of disease in farm and exotic animals in the environment in which they are produced.

**700.07 Diagnostic Laboratory Medicine**

Application of radiological principles to diagnosis and development of techniques and interpretations in clinical pathology.

**700.08 Applied Preventive Medicine**

Intensive practical training: Public Health and Food Hygiene, meat inspection, Federal and State Disease Control Programs, and Herd Disease Management.

794 P 1-15

**Group Studies in Veterinary Medicine**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 30 cr. hrs.

Group studies in selected areas of veterinary medicine.

**Veterinary Pathobiology**

Office: 207 Veterinary Pathology, 1925 Coffey Road

**Professors** Koestner (Acting Chairman), Capen, Cole (Regents), Farrell, Groves, Liss, Marsh, and Yohn; **Associate Professors** Fetter, Kerr, Long, and Shaddock; **Assistant Professors** Davis, Hoover, Kahn, Milo, Nagode, and Olsen. **Instructor** Chatfield.

610 P G 2-5

**Advance Veterinary Parasitology**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

A review of literature, detailed study of classification, morphology, life histories, and economic importance of animal parasites. Chatfield and Groves.

625 P G 2-10

**Pathology Techniques**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Theory and application of technical methods employed in modern animal disease research; coordinated approach to animal disease investigation, including functional-, chemical-, gross-, and histopathology. Farrell, Yohn, and Olsen.

640 P G 3

**Pathobiology**

A.

Prereq.: Permission of instructor.

(Offered in co-operation with the Department of Pathology.)

Presentation of up-to-date seminars on topics in comparative cellular pathology by faculty in the College of Veterinary Medicine and Medicine. Bishop.

693 P G 1-10

**Individual Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to maximum of 24 cr. hrs.

Laboratory, library, conference, and reports concerning animal disease problems. Cole, Koestner, Capen, Groves, and Yohn.

709 P 4

**Advanced Applied Pathology**

Su, A, W, Sp.

Prereq.: Vet. Med. 4th yr. standing.

Repeatable to a maximum of 8 cr. hrs.

Laboratory, library, conference, and reports concerning animal disease problems. Cole, Koestner, Capen, Groves, and Yohn.

711 P 4

**Advanced Applied Veterinary Microbiology**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 8 cr. hrs.

Advanced training in the causes of infectious diseases of animals.

**715 P G 2-10**  
**Veterinary Surgical Pathology**

Sp.  
 Prereq.: Permission of instructor.  
 Biopsy methods and diagnosis; surgical specimens are studied, and emphasis is placed upon the correlation of lesions and functional pathology. Koestner, Long, and Davis.

**720 P G 2-10**  
**Comparative Oncology**

A.  
 Prereq.: Permission of instructor.  
 A comparative study of the basic mechanisms of oncogenesis in man and animals.

**794 P G 1-8**  
**Group Studies in Veterinary Pathobiology**

Su, A, W, Sp.  
 Repeatable to a maximum of 24 cr. hrs.

**794.01 Applied Pathology**  
 Correlation of functional morphological, and chemical abnormalities in disease of domestic and companion animals.

**794.02 Comparative Pathology**  
 The comparative response of animal species to injury caused by toxic and radioactive materials, nutritional, and metabolic disturbances, and infectious agents.

**794.03 Applied Veterinary Immunology and Immunopathology**  
 Prereq.: Permission of instructor.  
 Discussion of the basic principles and theories of immunity and immunological disease as they apply to veterinary medicine.

**794.04 Applied Veterinary Parasitology**  
 Prereq.: Permission of instructor.  
 Emphasis on the identification of the major parasitic pathogens of domestic animals.

**794.05 Applied Veterinary Microbiology**  
 Prereq.: Permission of instructor.  
 Emphasis on the identification of the major bacterial and mycological pathogens of domestic animals.

**794.06 Applied Veterinary Virology**  
 Prereq.: Permission of instructor.  
 Major viral pathogens of domestic animals are discussed and illustrated. Principles of virology applicable to the recognition, differentiation, and prevention of diseases of animals are presented.

**794.07 Diseases of Poultry and Game Birds**  
 Prereq.: Permission of instructor.  
 A study of the etiology, recognition, prevention and control of the important diseases of poultry and related game birds.

**810 G 2-10**  
**Advanced Systemic Pathology**

Su, A, W, Sp.  
 Prereq.: Permission of instructor.  
 An advanced study of animal diseases as they effect all organ systems of the body. Shadduck, Capen, and Farrell.

**850 G 1**  
**Seminar in Veterinary Pathobiology**

Su, A, W, Sp.  
 Repeatable to a maximum of 16 cr. hrs.

**999 G Arr.**  
**Research in Veterinary Pathobiology**

Su, A, W, Sp.  
 Research for thesis or dissertation purposes only.

## Veterinary Physiology and Pharmacology

Office: 351 Sisson Hall, 1900 Coffey Road

Professors Smith (Acting Chairman), Hamlin, Smith, and Yeary; Assistant Professors Hensel, Oliver, and Saiduddin; Instructor Wright.

**210 U 5**  
**Animal Physiology**

A. 5 cl.  
 Prereq.: Chem. 102 or 122.  
 Consideration of concepts and principles involved in the function of various body systems and principles of growth and aging.

**211 U 5**  
**Animal Physiology**

W. 5 cl.  
 Prereq.: Chem. 102 or 122.  
 Comparative study of physiological concepts and principles involved in reproduction and metabolism in various species of domestic animals.

**640 P G 3**  
**Design and Analysis of Comparative Biomedical Research I**

A.  
 Prereq.: Permission of instructor.  
 Theory and application of basic statistical concepts as they affect design, analysis, and interpretation of veterinary medical research. Hensel, Powers, and Hamlin.

**641 P G 3**  
**Design and Analysis of Comparative Biomedical Research II**

W.  
 Prereq.: Permission of instructor.  
 Theory and application of basic statistical concepts as they affect design, analysis, and interpretation of veterinary medical research. Hensel, Powers, and Hamlin.



**693 P G 3-15****Individual Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Laboratory and library investigations concerning animal physiology and pharmacology problems. Smith, Powers, Hamlin, and Yeary.

**694 P G 2-5****Group Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

**740 P G 3****Analysis of Physiological Systems I**

Sp.

2 cl., 1 3-hr. lab.

Prereq.: Permission of instructor.

Several physiological systems will be analyzed in detail using a combination of classical mathematical analysis, model building, and newer analog and digital techniques. Hensel, Hamlin, and Powers.

**741 P G 3****Analysis of Physiological Systems II**

Su.

2 cl., 1 3-hr. lab.

Prereq.: Permission of instructor.

Several physiological systems will be analyzed in detail using a combination of classical mathematical analysis, model building, and newer analog and digital techniques. Hensel, Powers, and Hamlin.

**779 P G 5****Comparative Mammalian Toxicology**

Sp. 4 cl., 2-hr. lab.

Principles of comparative mammalian toxicology and their relationships to the safety evaluation of chemical substances. Yeary.

**780 P G 3****Antimicrobial Therapy in Veterinary Medicine**

Sp. 3 cl.

Prereq.: Permission of instructor.

A detailed study of the basic principles and clinical application of antimicrobial drugs in veterinary medicine. Powers.

**790 P G 3****Veterinary Physiology**

A. 2 cl., 2 lab. hrs.

Prereq.: Permission of instructor.

Comparative electrocardiography. Hamlin and Smith.

**791 P G 3****Veterinary Physiology**

W. 2 cl., 2 lab. hrs.

Prereq.: 790 or permission of instructor.

Comparative hemodynamics and cardiovascular sound. Hamlin and Smith.

**792 P G 3****Veterinary Physiology**

Sp. 2 cl., 2 lab. hrs.

Prereq.: 791 or permission of instructor.

Advanced comparative cardiovascular physiology with emphasis upon circulatory response to stress of various congenital and acquired cardiovascular defects. Hamlin and Smith.

**794 P G 1-6****Group Studies**

Su, A, W, Sp.

Prereq.: Professional or graduate student status.

Group studies courses in areas of comparative physiology and pharmacology.

**795 P G 3-5****Advanced Comparative Electrocardiography**

A.

Prereq.: 790 or permission of instructor.

Cellular and cardiac electrophysiologic and clinical features of complex cardiac arrhythmias and conduction disturbances. Hamlin.

**799 P G 2****Seminar**

A, W, Sp. 1 2-hr. conf. and lec.

Prereq.: Permission of instructor.

Repeatable to a maximum of 30 cr. hrs.

Lectures and conferences on selected topics in veterinary physiology and pharmacology.

**999 G Arr.****Research in Veterinary Physiology and Pharmacology**

Su, A, W, Sp.

Research for thesis or dissertation purposes only.

## Veterinary Preventive Medicine

Office: 252 Sisson Hall, 1900 Coffey Road

**Professors** Helwig (Chairman), Bohl, Ferguson, Jones, and Tyznik; **Associate Professor** Kreier; **Assistant Professors** Buller, Robinson, and Wittich.**200 U 3****Basic Animal Hygiene**

A. 3 cl.

Causes of disease and the relationship of these causes to the animal's environment. Helwig.

**201 U 3****Applied Animal Hygiene**

W. 3 cl.

Prereq.: 200 or equiv.

Various common diseases responsible for losses to the livestock industry, with emphasis on control. Helwig and Robinson.

**616 P G 5****Germfree and Gnotobiotic Animals**

W, Sp. 3 2-hr. cl. and lab.

Prereq.: Advanced standing in Biological Sciences, Microbiol. 607, or equiv., and permission of instructor.

The instrumentation of biological research through application of germfree and gnotobiotic animals.

**693 P G 2-5****Individual Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs.

Laboratory and library investigations of animal disease problems involving Veterinary Preventive Medicine. Helwig and Jones.

**785 P G 3****Biological Research Techniques**

A, W, Sp. 2 2-hr. cl. and lab.

Prereq.: Advanced standing in Biological Sciences, Microbiol. 607, or equiv., and permission of instructor.

The more common laboratory animals used in biological research and testing will be dealt with as they relate to research purposes, design, and application.

**794 P G 1-8****Group Studies**

Su, A, W, Sp.

Prereq.: Vet. Med. 3rd or 4th year standing.

Repeatable to a maximum of 30 cr. hrs.

A course providing small group instruction in the topics designated.

**794.01 Public Health—Organization and Administration**

Philosophy and application of public health principles and practices, exposure to various health agencies with public health responsibilities; coverage of general organizations, administration, disease reporting, vital statistics and health education.

**794.03 Prevention of Communicable Diseases**

Fundamental approaches used by State and Federal Animal Health Agencies for prevention, control, and eradication of diseases.

**794.04 Food-Borne Illnesses and Human Health**

Detailed study of principle zoonotic diseases transmitted by meat foods and food-borne intoxications and infections as related to personal hygiene of food handlers and sanitary food handling practices; the epidemiological approach to problem solving.

**794.05 Applied Food Hygiene**

Ante-mortem and post-mortem inspection procedures; disposition of diseased carcasses and parts—applied pathology as relates to meat inspection. Meat chemistry and processing; environmental sanitation; food microbiology.

**794.07 Environmental Factors in Animal Health**

Discussion of environmental factors such as housing, ventilation, humidity, waste disposal and sanitation, with emphasis on types of systems and their influence on large animal health and production.

**794.09 Preventive Medicine for Dairy Cattle**

Principles and applications of preventive medicine in establishing and maintaining dairy herd health promotion programs.

**794.10 Applied Zoo Animal Preventive Medicine and Public Health**

Practice control and preventive practices intended to protect animal and human health including food, housing, waste, and various other environmental factors, together with testing and screening procedures.

**794.11 Laboratory Animal Facilities**

To provide a progressive course of instruction pertaining to facilities, equipment, materials, and caging which is comprehensive to assure the development of veterinarians who can provide support where laboratory animals are used.

**810 G 3-8****Veterinary Public Health**

Su, A, W.

Prereq.: 610.

Laboratory and library investigation of veterinary public health problems. Helwig, Jones, and Russell.

**850 G 1****Seminar in Veterinary Preventive Medicine**

A, W, Sp.

Repeatable to a maximum of 3 cr. hrs.

**999 G Arr.****Research in Veterinary Preventive Medicine**

Su, A, W, Sp.

Research for thesis or dissertation purposes only.

## Welding Engineering

Office: 124 Welding Engineering Laboratories, 190 West 19th Avenue

**Professors** McCauley (Chairman), R. Green, and McMaster (Regents); **Associate Professors** Funk and Jackson; **Assistant Professor** W. Green.

**240 U 4****Forging, Heat Treating, and Welding**

Su, A, W, Sp. 3 cl., 3 1-hr. lab.

Safety glasses must be worn in laboratory.

Welding fundamentals and applications; intended for students not having an engineering background; laboratory work designed to augment classroom discussions and provide basic welding skills.

**302 U 4****Introduction to Welding Engineering**

W. 3 cl., 1 3-hr. lab.

Prereq.: Indust. E. 301 or permission of instructor.

Safety glasses must be worn in laboratory.

An introduction to welding engineering for undergraduate students to familiarize them with the broad field of welding engineering and particularly welding processes. Jackson.

340 U 3

**Welding Science and Its Application**

Sp. 3 cl.

Prereq.: 240 or permission of instructor.

Not open to students majoring in Weld. E. Not open to students with credit for 640.

A study of the engineering fundamentals of welding; design, materials, and processes are considered as related to the welding field. Jackson.

430 U 4

**Applied Engineering Analysis**

Sp. 3 cl., 1 3-hr. lab.

Prereq.: Physics 133 and Math. 255.

The analysis of engineering systems by the application of fundamental principles of conservation of matter and energy, and operational techniques. McMaster.

488 U 1

**Welding Engineering Inspection Trip**

Sp. Between W. and Sp. Qtrs.

Safety glasses are required.

A group visit to selected industrial facilities in a localized region of the state or in a single community.

489 U 2

**Practical Experience in a Welding Organization**

A. 10 wks. during Su.

Prereq.: Permission of chairman.

Experience in an engineering organization and the preparation of an acceptable report on the organization and the work done.

501 U G 4

**Principles of Welding**

A. 3 cl., 1 3-hr. lab.

Prereq.: 302, 430, and Elec. E. 500.

Safety glasses must be worn in laboratory.

Theory, equipment, techniques, and control of fusion welding with electric arc, gas, and other processes; welding codes and specifications; application of electrodes and processes. McMaster.

502 U G 4

**Principles of Resistance Welding**

A. 3 cl., 1 3-hr. lab.

Prereq.: 430 and Elec. E. 520.

Not open to students with credit for 602.

Safety glasses must be worn in laboratory.

Theory and operation of resistance welding equipment, power supplies, electronic controls, welding codes and schedules, and process controls. McMaster.

510 U G 4

**Physics of Welding**

Sp. 3 cl., 1 3-hr. lab.

Prereq.: Indust. E. 301 and Engr. Mech. 420.

Not open to students with credit for 610.

Safety glasses must be worn in laboratory.

The application of basic principles in the welding processes. Funk.

588 U 1

**Welding Engineering Inspection Trip**

Sp. Between W. and Sp. Qtrs.

Safety glasses are required.

A group visit to various industrial plants; the plants selected are generally grouped in one community; a written report is required.

589 U 2

**Practical Experience in Welding Industry**

A. 10 wks. during Su.

Prereq.: Permission of chairman.

Experience in an engineering organization and the preparation of an acceptable report on the organization and the work done.

601 U G 4

**Semi-Automatic Welding Processes**

W. 3 cl., 1 3-hr. lab.

Prereq.: 501 and Elec. E. 520.

Laboratory and lecture study of welding power supplies utilized in semi-automatic arc-welding process including metal-inert-gas, tungsten-inert-gas, and submerged-arc process. Jackson.

611 U G 4

**Theory of Welding**

A. 4 cl., 1 3-hr. lab.

Prereq.: 501 and Met. E. 500.

Safety glasses must be worn in laboratory.

The application of basic metallurgical principles in the welding processes; the weldability of metals is studied; laboratory work involves physical and metallographic examination of welded specimens. Jackson.

612 U G 4

**Application of Welding Engineering**

W. 3 cl., 1 3-hr. lab.

Prereq.: 611.

Safety glasses must be worn in laboratory.

The principles by which manufacturing procedures for materials may be developed; an analysis of processing methods; material, physical and mechanical properties, inspection, and performance and service testing. McCauley.

630†\* U G 3

**Analysis of Continuous Systems**

Sp. 3 cl.

Prereq.: 430 or permission of instructor.

An energy analysis of analogous one-dimensional linear distributed systems with applications to welding process and control systems. McMaster.

631 U G 4

**Nondestructive Testing**

W. 3 cl., 1 3-hr. lab.

Prereq.: Elec. E. 520.

Safety glasses must be worn in laboratory.

Principles, equipment, techniques, and interpretation of nondestructive tests with X-rays, radioisotopes, magnetic fields, penetrants, ultrasonics, eddy currents, and other probing media. McMaster.

680†\*

U G 1

**Continuous Systems Laboratory**

Sp. 1 3-hr. lab.

Concur.: 630.

Laboratory exercises in measurement of transients in continuously-distributed linear engineering systems (particularly on advanced welding equipment), and analog computer solutions where feasible.

704†\*

U G 3

**Theory of High Energy Density Welding Processes**

Sp. 3 cl.

Prereq.: 501; and Elec. E. 520 or equiv.; or permission of instructor.

Theory of physical and thermal processes in high-pressure arc, plasma, electron beam, laser, and other high-energy-density welding processes. McMaster.

705\*

U G 3

**Principles of Welding Process Control Systems**

Sp. 3 cl.

Prereq.: 430, 501, 502, and Elec. E. 520 and 550; or permission of instructor.

Principles of continuously-variable and digital control systems for manual, mechanized, automatic, and feedback operation of arc, resistance, and advanced welding processes. McMaster.

720

U G 4

**Welding Design**

A. 3 cl., 1 3-hr. lab.

Prereq.: Civil E. 530.

The analysis and design of statically determinate and indeterminate members and structures; a study of welding procedures for shop fabrication and field erection. W. Green.

721

U G 4

**Welding Design**

W. 3 cl., 1 3-hr. lab.

Prereq.: 720 and Mech. E. 350.

The analysis and design of machine elements and frames to a given set of shop conditions and facilities; emphasis on cost factor considerations. W. Green.

722

U G 4

**Welding Design**

Sp. 3 cl., 1 3-hr. lab.

Prereq.: 502 and 721.

The design of resistance welded products; a selection of process and equipment and a study of tooling used in high production work. W. Green.

755\*

U G 1

**Welding Process Control Laboratory**

Sp. 1 3-hr. lab.

Concur.: 705.

Laboratory experiments in basic instrumentation and control systems for welding processes such as arc, resistance, electron-beam, and others.

793

U G 1-15

**Individual Studies in Welding Engineering**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

794

U G 1-15

**Group Studies in Welding Engineering**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

The student must register for particular topics from fields of welding engineering listed below; the topics, cr. hrs., and instructors will be announced in quarter previous to the quarter offered:

- a. Welding Refractory Metals.
- b. Arc Welding Systems.
- c. Manufacturing in the Welding Industry.
- d. Electron Beam Technology.
- e. Plasma Technology.
- f. Advanced Nondestructive Testing.
- g. Welding Discontinuities.
- h. Welding Fluxes and Slags.
- i. Welding Discontinuities Evaluation.
- j. Residual Stresses in Welding.
- k. Sonic Power Systems.
- l. Weld Metal Solidification.

799

U 2-15

**Thesis**

Su, A, W, Sp.

Prereq.: 4th yr. standing and permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Undergraduate research providing an opportunity to publish a report in appropriate technical publications.

884

G 2-9

**Advanced Problems in Welding Engineering**

Su, A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 24 cr. hrs.

This course is intended to give the advanced students opportunity to pursue advanced study, work undertaken may be elected from the following fields of welding engineering:

- a. Chemical Reactions in Welding.
- b. Advanced Welding Processes I.
- c. Advanced Analysis of Welding Weldments.
- d. Advanced Welding Metallurgy.
- e. Advanced Analysis of Welding Systems.
- f. Advanced Welding Design.
- g. Weld Bond.

999

G Arr.

**Research in Welding Engineering**

Su, A, W, Sp.

Research for thesis or dissertation purposes only.

## Zoology

Office: 104 Botany and Zoology Building, 1735 Neil Avenue

**Professors** Peterle (Chairman), Bookhout, Borror, Colinviaux, Crites, Giltz, Kostir (Emeritus), D. F. Miller (Emeritus), J. A. Miller (Emeritus), J. N. Miller (Emeritus), Mitchell, Myers, Myser, Price (Emeritus), Putnam, Reese (Emeritus), Rothenbuhler, Stansbery, Tidd, Trautman (Emeritus), and Tubb; **Associate Professors** Carey, Cavender, Herdendorf, Kessler, Lustick, Miskimen, Momot, Parrish, Stevens, and Valentine; **Assistant Professors** Berra, Curnow, Gaunt, Greenwald, Hillis-Colinviaux, Martin, St. John, K. Smith, and Tassava; **Instructors** Addis, Burnard, Jezerinac, Rennie, and Troutman.

### 201 U 5

#### General Zoology

A, W, Sp. 3 cl., 2 2-hr. labs.

Prereq.: Biol. 100.

Not open to students with credit for 101.

A study of the variety of animals with emphasis on organ systems and their functions, the interrelationships with each other, space, and time.

### 205 U 2

#### Ecology and Environmental Concern

Sp. 2 cl.

Not open to students with credit for Biol. 205.

An analysis of environmental problems, the facts underlying them, and their implication for the human future as seen by professional ecologists. Colinviaux.

### 211 U 5

#### Invertebrate Zoology

Sp. 3 cl., 2 2-hr. labs.

Prereq.: 201 or equiv.

Not open to students with credit for 402.

A survey of the invertebrates with emphasis on morphology and relationships of representative types. Mitchell.

### 220 U 5

#### Ornithology

Sp. 2 cl., 1 2-hr. lab.

Prereq.: 201 or equiv. and 10 additional cr. hrs. in biological sciences.

A study of the general biology and classification of birds, with emphasis on field identification of local species; field trip each Saturday. Giltz.

### 231 U 5

#### Functional Anatomy and Physiology I

A, W. 3 cl., 2 2-hr. labs.

Prereq.: Biol. 100.

The dermal, skeletal, and muscular systems with emphasis on man. Kessler.

### 232 U 5

#### Functional Anatomy and Physiology II

W, Sp. 3 cl., 2 2-hr. labs.

Prereq.: 231.

The metabolic systems with emphasis on man. Greenwald.

### 240 U 4

#### Introductory Ethology

Sp. 4 cl.

Prereq.: 201.

Observations of animal behaviors, and introductory analysis of their adaptive value, physiological mechanisms, development, and evolution; emphasis on movie presentations, reading, and small-group discussions. Rothenbuhler.

### 313

#### Introduction to Ecology

Prereq.: Biology 101.

An introduction to biotic communities, interrelations of a community with its physical environment, and the application of ecological principles to human affairs.

#### 313.01 Lecture U 3

A, W, Sp. 3 cl.

Not open to students with credit for Biol. 313, 313.01, or 313.02.

#### 313.02 Laboratory U 2

A, W, Sp. 2 lab. hrs.

Prereq. or concur.: 313.01.

Not open to students with credit for Biol. 313 or 313.01.

Colinviaux, Mitchell, and Racine.

### 320 U 3

#### Introduction to Biology of the Sea

W. 3 cl.

Prereq.: 313.01 or equiv.

Kinds, distribution, interactions, and physiological problems of marine organisms; the oceanic environment; pollution and productivity of the oceans. Hillis-Colinviaux.

### 420 U 5

#### Evolution

A, Sp. 5 cl.

Prereq.: 201 and Bot. 100 and 101, or 102.

Not open to students with credit for Biol. 420.

The principles of organic evolution; demonstrations and discussions of the facts and theories underlying the evolution of man and other living things. Tidd.

### 430 U 5

#### Vertebrate Embryology

Sp. 3 cl., 2 3-hr. labs.

Prereq.: 434 or equiv.

Not open to students with credit for Anat. 616.

Embryology of representative amphibia, birds, and lower mammals from fertilization through organogenesis. Tassava.

### 432 U 5

#### General Physiology

W. 3 cl., 2 3-hr. labs.

Prereq.: Chem. 242 or equiv., Physics 113 or equiv., and 15 cr. hrs. in biological sciences.

A laboratory survey of physiological mechanisms in animals. Lustick.

**434 U G 5****Problems in Vertebrate Structure**

A, W. 3 cl., 2 3-hr. labs.

Prereq.: 5 cr. hrs. in zool., or Physics 111 or equiv., or permission of instructor.

Not open to students with credit for 231 or 234.

Exploration of interactions of historical, mechanical, and functional factors that have selected for structures of present vertebrates; emphasis on the comparative approach. Gaunt.

**500† U G 5****Basic Concepts and Recent Advances in Zoology**

W. 3 2-hr. cl.

Prereq.: High school teacher status and 15 cr. hrs. natural science at the 200 level.

Animal functions and genetic and environmental interrelationships in time and space as illustrated by selected animal types. Tidd.

**530† U G 5****General Histology**

W. 3 cl., 2 3-hr. labs.

Prereq.: 434 or equiv.

Not open to students with credit for Anat. 607.

A detailed study of the tissues of vertebrate animals, and a general survey of the microscopic structure of various organs.

**531 U G 5****Principles of Physiology**

Sp. 3 cl., 2 2-hr. labs.

Prereq.: Academic Year Science Institute students only. 15 cr. hrs. Biological Sciences, 15 cr. hrs. Chem., and/or Physics, and permission of instructor.

The nature and behavior of living organisms and their relationship to their environment with special consideration of the functions of vertebrate organ systems. Lustick.

**610 U G 5****Animal Parasites**

A, W. 2 cl., 3 2-hr. labs.

Prereq.: 201 or equiv., Jr. standing or above, and permission of instructor.

The general principles of parasitology, the morphology, life history, and classification of parasites, and their host relationships; recommended for students preparing for medical or zoological work.

**611\* U G 4****Animal Parasitology**

Su (2nd term). Franz Theodore Stone Lab., 3 all-day cl. per wk.

Prereq.: 201 or equiv.

Emphasis on the parasites infesting freshwater vertebrates, including field and laboratory experiences, host examination, and techniques dealing with staining, fixing, and mounting of specimens.

**612 U G 4****Invertebrate Zoology**

Su (2nd term). Franz Theodore Stone Lab., 3 all-day cl. per wk.

Prereq.: 201 or equiv.

The collection and identification of invertebrate animals, development of methods of classification, and use of keys.

**620 U G 5****Zoology of Vertebrates**

A, Sp. 3 cl., 2 2-hr. labs.

Prereq.: 201 or equiv.

A study of the various vertebrate groups, emphasizing their origin, phylogeny, classification, life histories, habits, distribution, and economic importance. Downhower.

**621 U G 4****Ichthyology**

Su (1st term). Franz Theodore Stone Lab., 3 all-day cl. per wk.

Prereq.: 201 or equiv.

Study of the distribution and classification of fishes, which includes methods of identification, collection, and preservation.

**622†\* U G 4****Herpetology**

Su (2nd term). Franz Theodore Stone Lab., 3 all-day cl. per wk.

Prereq.: 201 or equiv.

Local species of reptiles and amphibians, their habits, life histories, ecology, and classification. Britt.

**623 U G 3****Biology of Birds**

Sp. 2 cl., 1 2-hr. lab.

Prereq.: 201 or equiv.

The aspects of anatomy, physiology, taxonomy, and behavior which are pertinent to the study of birds. Putnam.

**624 U G 4****Advanced Ornithology**

Su (1st term). Franz Theodore Stone Lab., 3 all-day cl. per wk.

Prereq.: 201 or equiv.

Topics include instinctive behavior in the life of birds, the breeding cycle, social relations, territory, ecology, characteristics of population, and techniques in field study of birds. Putnam.

**625 U G 5****Mammalogy**

W. 3 cl., 2 2-hr. labs.

Prereq.: 201 or equiv.

The comparative morphology, taxonomy, life histories, distribution, and importance of the mammals.

**626 U G 5****Biology of Fishes**

Sp. 3 cl., 1 3-hr. lab.

Prereq.: 201, 15 cr. hrs. in biological sciences, and permission of instructor.

The laboratory emphasizes ecological and systematic ichthyology; lectures emphasize the behavior, migration, distribution, and evolution of fishes. Cavender.

**630 U G 5****Comparative Embryology**

W. 3 cl., 2 2-hr. labs.

Prereq.: 201 or equiv.

A survey of various modes of embryonic development, illustrated with both invertebrate and vertebrate type material with emphasis on fundamental aspects and processes. Tassava.

**633 U G 5****Vertebrate Physiology**

Sp. 3 cl., 2 3-hr. labs.

Prereq.: 432 or equiv., or graduate standing.

The physiology of vertebrate animals with emphasis on exchange rates, metabolic rates, energetics, and homeostasis. Lustick.

**640 U G 5****Animal Behavior**

A, W. 3 cl., 2 2-hr. labs.

Prereq.: 201 or equiv.

An experimental study of the anatomical basis of animal reactions. Putnam.

**650 U G 5****Principles of Animal Ecology**

Sp. 3 cl., 2 2-hr. labs., Sat. field trips.

Prereq.: 313.01 and 313.02.

Principles and methods of animal ecology and their application to other closely related biological sciences. Stansbery.

**651 U G 4****Field Zoology**

Su (1st term). Franz Theodore Stone Lab., 3 all-day cl. per wk.

Prereq.: 201 or equiv.

Field and laboratory identification of aquatic and terrestrial vertebrates and invertebrates of the region, in relation to habitats occupied; of special interest to biology teachers.

**652 U G 4****Limnology**

Su (1st term). Franz Theodore Stone Lab., 3 all-day cl. per wk.

Prereq.: 201 or equiv., 10 cr. hrs. in chem., 10 cr. hrs. in physics.

Study of physical, chemical, and biological factors influencing fresh water life; field and laboratory techniques for determining area, chemical, natural flora, and fauna are emphasized. Britt.

**653 U G 4****Fish Ecology**

Su (2nd term). Franz Theodore Stone Lab., 3 all-day cl. per wk.

Prereq.: 621 or equiv.

Studies of life histories and interspecific relationships of fishes and of the various factors influencing their abundance.

**654†\* U G 4****Ecological Physiology of Aquatic Animals**

Su (2nd term). Franz Theodore Stone Lab., 3 all-day cl. per wk.

Prereq.: 201 or equiv., and 10 cr. hrs. of chem., physics, or physiol.

Study of the aquatic habitat includes physical and chemical adjustment, tolerance, and acclimatization to environment of vertebrates and invertebrates.

**655 U G 5****Limnology**

A. 3 hr. lec.—seminar, 1 4-hr. lab.

Prereq.: 10 cr. hrs. chem., 20 cr. hrs. in biological sciences, and permission of instructor.

A study of the physical, chemical, and biological factors influencing the biological productivity of inland waters and of techniques and equipment used in evaluating them. Britt and Tubb.

**660 U G 5****Fisheries Biology**

A. 3 cl., 2 2-hr. labs.

Prereq.: 313.01 and 313.02 or equiv.

The productivity of fish populations and the ecological relationships between fishes and other aquatic organisms. Momot.

**661 U G 5****Wildlife Biology**

A. 3 cl., 2 2-hr. labs.

Prereq.: 15 cr. hrs. in Zool. above the 200 level, including 313.01 and 313.02.

An introductory course in the biology and importance of wildlife; emphasis on biological principles as they relate to birds and mammals.

**662 U G 5****Wildlife Biology Techniques**

W. 3 cl., 2 2-hr. labs., Sat. field trips.

Prereq.: 661 or equiv., Genetics 650 or equiv., and permission of instructor.

Techniques employed in the field of wildlife biology, with emphases on game birds and mammals; designed for zoology majors specializing in wildlife biology. Bookhout.

**670† U G 5****Radiation Biology**

Su.

Prereq.: High school teacher status and Zool. 201 or equiv., Physics 516 or concur., and 10 cr. hrs. in general Chem. and Physics.

(N.S.F. Summer Institute students only.)

Not open to students with credit for Biol. 670.

A study of the principles of radiation biology and their application to high school and college teaching.

**693 U 2-5 G 2-10****Individual Studies**

Su, A, W, Sp.

Prereq.: Permission of instructor.

No more than 5 cr. hrs. may be counted toward an undergraduate zool. major.

Repeatable to a maximum of 15 cr. hrs. for undergraduates.

Individual work in the field of the chosen problem.

- a. Anatomy.  
Gaunt.
- b. Animal Behavior.  
Putnam, Rothenbuhler, and Gaunt.
- c. Animal Ecology.  
Peterle, Stansbery, Giltz, Colinvaux, Downhower, Mitchell, Momot, and Berra.
- d. Embryology and Vertebrate Zoology.  
Downhower and Tassava.
- e. Invertebrate Zoology.  
Crites, Mitchell, Tidd, and Tubb.
- f. Ornithology.  
Borrer, Gaunt, Lustick, Miskimen, Putnam, and Kessler.

- g. Parasitology.  
Crites, Martin, Tidd, and Mitchell.
- h. Wildlife Biology.  
Bookhout, Curnow, and Peterle.
- i. General Limnology.  
Britt, Colinvaux, Hillis-Colinvaux, Momot, Smith, and Tubb.
- j. Comparative Physiology.  
Lustwick, Greenwald, and Tassava.
- k. Electron Microscopy.  
Parrish.
- l. Population Ecology.  
Colinvaux, Downhower, Peterle, and Mitchell.
- m. Systematics.  
Borror, Berra, Cavender, Gaunt, Valentine, Mitchell and Stansbery.
- n. Ichthyology.  
Berra, Cavender, Momot, and Trautman.
- o. Fisheries Biology.  
Berra, Cavender, Momot, Trautman, and Tubb.

**694 U G 2-5****Group Studies**

A, W, Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 20 cr. hrs. for undergraduates and to a maximum of 35 cr. hrs. for graduates.

Group work in the field of the chosen problem (see topics in 693).

**700 U G 5****Principles of Biogeography**

Sp. 5 cl.

Prereq.: Permission of instructor.

Principles and patterns of animal and plant distribution over the world, using historical, geographic, and biological approaches. Valentine.

**710\* U G 5****Fish and Wildlife Parasitology**

Sp. 3 cl., 2 2-hr. labs.

Prereq.: Permission of instructor.

Emphasis on parasites infesting fish and wild animals, on life histories, ecology, host-parasite relationships, pathology and control, field and laboratory experience; host examination techniques. Crites.

**H783 U 3-5****Honors Course**

Su, A, W, Sp.

Prereq.: 4th yr. standing with a grade of A in at least half of the courses in Biol. Sci. and an average of B in the remainder; permission of instructor under whose supervision the work is to be completed and the Arts and Sciences Honors Committee.

At least 2 qtrs. are required of candidates for the degrees Bachelor of Science or Bachelor of Arts with distinction in Zoology. Failure to receive a mark of S in this course is a disqualification for special honors.

Repeatable to a maximum of 15 cr. hrs.

A program of reading and research for each student with individual conferences, reports, and Honors thesis.

**800 G 3****Zoological Literature and Preparation of Manuscripts**

W. 2 cl., 1 2-hr. lab.

Prereq.: 15 cr. hrs. of biol., entom., or zool. at the 600 level or above.

A study of library organization bibliographies, and guides to zoological literature; the preparation of scientific papers for publication.

**810 G 8****Ecological Investigations of Biotic Areas of North America**

A. Pre-field trip from Sept. 1-30; 1 2-hr. seminar on campus during A. Quarter.

Prereq.: Bot. 620 or Zool. 650 or 661, 20 additional graduate cr. hrs. in Biological Sciences and permission of instructor.

Fee of \$145 for travel and subsistence.

Not open to students with credit for Biol. 810.

Full time of the student will be required traveling and living away from the campus; intensive field work in a variety of environments will involve both supervised and independent study.

**811†\* G 5****Advanced Zoology of Invertebrates**

Sp. 3 cl., 2 2-hr. labs. Field trips including a 1 wk. optional trip to a marine lab.

Prereq.: 211 or equiv. and permission of instructor.

A study of the morphology, physiology, life histories, and classification of the acoelomate pseudocoelomate invertebrates and the annelid worms. Crites.

**812†\* G 5****Advanced Zoology of Invertebrates**

Sp. 3 cl., 2 2-hr. labs. Field trips including 1 wk. optional trip to a marine lab.

Prereq.: 211 or equiv. and permission of instructor.

A study of the morphology, physiology, life histories, and classification of the eucoelomate invertebrates exclusive of annelid worms. Crites.

**820 G 5****Biological Effects of Ionizing Radiation**

Sp. 2 cl., 2 2-hr. labs.

Prereq.: Permission of instructor.

A course in the theory, use, and analysis of the effects of ionizing radiation on living organisms. Myser.

**821\* G 5****Helminthology**

W. 3 cl., 2 2-hr. labs.

Prereq.: 610 or 611 or equiv. and permission of instructor.

A study of the morphology, physiology, life histories, epidemiology, and pathology of parasitic acoelomate helminths. Crites.

**822\* G 5****Helminthology**

W. 3 cl., 2 2-hr. labs.

Prereq.: 610 or 611 or equiv. and permission of instructor.

A study of the morphology, physiology, life histories, epidemiology, and pathology of the parasitic pseudocoelomate helminths. Crites.



**840 G 5****Behavior Genetics**

W. 3 1½-hr. cl.

Prereq.: Genetics 500 or equiv.; and Zool. 640 or Psych. 300 or equiv.

Development of ethological theory, genetic bases of behavioral differences, and evolution of behavior in laboratory, wild, and domestic species of both vertebrates and invertebrates. Rothenbuhler.

**841 G 3****Bioacoustics**

Sp. 1 cl., 2-hr. lab. and field trip.

Prereq.: Permission of instructor.

A study of the nature and biological significance of animal sounds. Borror.

**851 G 5****Population Ecology**

W. 5 cl.

Prereq.: 313.01, 313.02, and 650.

Interactions of animal populations considered from the environmental, physiological, and biometrical aspects. Peterle.

**860 G 2-5****Seminar on Historical Ecology**

Sp.

Prereq.: Permission of instructor.

Repeatable to a maximum of 15 cr. hrs.

Study of developing ecosystems through long spans of time through reconstructions of past communities from fossil evidence. Colinvaux.

**861 G 3****Principles of Systematics**

A. 2 cl., 2 hr. lab.

Prereq.: 15 cr. hrs. of Zool. or Entom. at the 600 level or above.

Not open to students with credit for Biol. 860.

A study of the principles and techniques used in the identification, classification, and nomenclature of organisms. Valentine.

**880 G 2****Seminar**

A. 1 cl.

Required of all graduate majors in zoology during the first Autumn Quarter of registration.

**881 G 1-3****Seminar**

A, W, Sp.

Repeatable to a maximum of 10 cr. hrs.

Selected topics to be announced.

**890 G 2****Interdepartmental Seminar in Developmental Biology**

A, W, Sp. 1 2-hr. cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 12 cr. hrs.

Students will present oral reports and lead discussion on research progress in specific areas of developmental biology.

**891 G 2****Interdepartmental Seminar in Environmental Biology**

Su, A, W, Sp. 1 2-hr. cl.

Prereq.: Permission of instructor.

Repeatable to a maximum of 24 cr. hrs.

Selected topics treating the environmental aspects of organisms, populations, and ecosystems as they may relate to time, space, and human activities.

**896 G 1-3****Interdepartmental Seminar in Polar and Alpine Studies**

Sp.

(See under Interdepartmental Seminars.)

**897 G 1****Interdepartmental Seminar in Natural Resources**

A, W, Sp.

(See under Interdepartmental Seminars.)

**999 G Arr.****Research in Zoology**

A, W, Sp.

Research for thesis and dissertation purposes only.

# University Calendar for 1973-74

## Summer Quarter 1973

June 19	Quarter and First Term classes begin, 8:00 a.m. (Tues.)
July 4	Legal holiday—Independence Day—No classes, offices closed (Wed.)
July 23-24	Final examinations for First Term courses only (at regular class hours) (Mon. and Tues.)
July 24	First Term ends, midnight (Tues.)
July 25	Second Term classes begin, 8:00 a.m. (Wed.)
August 27-28	Final examinations for Second Term courses only (at regular class hours) (Mon. and Tues.)
August 28	Last day of regularly scheduled classes (Tues.)
August 29-31	Final examinations for Quarter courses (Wed.-Fri.)
August 31	Summer Commencement, 9:00 a.m., St. John Arena (Fri.)
August 31	Summer Quarter ends, midnight (Fri.)

## Admission and Registration Dates

### Admission Dates

Last day to file applications for admission

Undergraduate and Continuing Education		Graduate and Professional*	
Columbus Campus	Regional Campuses		
June 1	June 1	June 1*	

### Registration Dates

#### Scheduling

#### Continuing Students (enrolled Spring Quarter)

Registration materials released  
in college offices (Graduate School at Registrar's Office)  
First day to file Registration Forms  
Last day to file Registration Forms

May 1	May 1	May 1
May 2	May 2	May 2
June 15	June 15	June 15

#### Returning Students (not enrolled Spring Quarter)

Registration materials released  
First day to file Registration Forms  
Last day to request Registration Forms  
Last day to file Registration Forms

May 1	May 1	May 1
May 2	May 2	May 2
June 15	June 15	June 18
June 15	June 15	June 18

#### New Students

Registration materials released  
First day to file Registration Forms  
Last day to file Registration Forms

May 1**	May 1**	May 1
May 2	May 2	May 2
June 15	June 15	June 18

#### Fees

#### Last day to pay fees

Quarter and First Term  
Second Term

June 15	June 15	June 18
July 20	July 20	July 20

#### Last day for withdrawal from the University

with any refund of fees  
First Term  
Quarter  
Second Term

July 2	July 2	July 2
July 17	July 17	July 17
Aug. 7	Aug. 7	Aug. 7

## Autumn Quarter 1973

September 3	Legal holiday—Labor Day—Offices closed (Mon.)
September 25	Classes begin, 8:00 a.m. (Tues.)
October 8	Legal holiday—Columbus Day—No classes, offices closed (Mon.)
October 22	Legal holiday—Veterans' Day—No classes, offices closed (Mon.)
November 22	Legal holiday—Thanksgiving—No classes, offices closed (Thurs.)
November 23-24	Student vacation—No classes, offices open (Fri. and Sat.)
December 7	Last day of regularly scheduled classes (Fri.)
December 10-14	Final examinations (Mon.-Fri.)
December 14	Autumn Commencement, 9:30 a.m., St. John Arena (Fri.)
December 14	Autumn Quarter ends, midnight (Fri.)
December 25	Legal holiday—Christmas—Offices closed (Tues.)

## Admission and Registration Dates

### Admission Dates

Last day to file applications for admission

Undergraduate and Continuing Education		Graduate and Professional*	
Columbus Campus	Regional Campuses		
Aug. 15	Aug. 15	Sept. 1*	

### Registration Dates

#### Scheduling

#### Continuing Students (enrolled Spring or Summer Quarters)

Registration materials released by mail  
to spring students, in college offices to  
summer students (Graduate School at Registrar's Office)  
First day to file Registration Forms  
Last day to file Registration Forms

July 23	July 23	July 23
July 24	July 24	July 24
Aug. 17	Aug. 17	Aug. 17

#### Returning Students (not enrolled Spring or Summer Quarters)

Registration materials released  
First day to file Registration Forms  
Last day to request Registration Forms  
Last day to file Registration Forms

July 23	July 23	July 23
July 24	July 24	July 24
Aug. 6	Sept. 5	Sept. 24
Aug. 17	Sept. 5	Sept. 24

#### New Students

Registration materials released  
First day to file Registration Forms  
Last day to file Registration Forms

July 23**	July 23**	July 23
July 24	July 24	July 24
Aug. 17	Sept. 5	Sept. 24

#### Fees

#### Last day to pay fees

Last day for withdrawal from the University  
with any refund of fees

Sept. 21	Sept. 21	Sept. 24
Oct. 24	Oct. 24	Oct. 24

**Winter Quarter 1974**

<b>January 1</b>	Legal holiday—New Year's Day—Offices closed (Tues.)
<b>January 3</b>	Classes begin, 8:00 a.m. (Thurs.)
<b>February 18</b>	Legal holiday—Washington-Lincoln Day—No classes, offices closed (Mon.)
<b>March 8</b>	Last day of regularly scheduled classes (Fri.)
<b>March 11-15</b>	Final examinations (Mon.-Fri.)
<b>March 15</b>	Winter Commencement, 9:30 a.m., St. John Arena (Fri.)
<b>March 15</b>	Winter Quarter ends, midnight (Fri.)

**Admission and Registration Dates****Admission Dates**

Last day to file applications for admission

<b>Undergraduate and Continuing Education Columbus Campus</b>	<b>Regional Campuses</b>	<b>Graduate and Professional*</b>
Dec. 1	Dec. 1	Dec. 1*

**Registration Dates****Scheduling****Continuing Students (enrolled Autumn Quarter)**

Registration materials released in college offices  
(Graduate School at Registrar's Office)—A-K Mon., L-Z Tues.  
First day to file Registration Forms  
Last day to file Registration Forms

Oct. 29, 30	Oct. 29, 30	Oct. 29, 30
Oct. 31	Oct. 31	Oct. 31
Nov. 10	Nov. 10	Nov. 10

**Returning Students (not enrolled Autumn Quarter)**

Registration materials released  
First day to file Registration Forms  
Last day to request Registration Forms  
Last day to file Registration Forms

Oct. 29	Oct. 29	Oct. 29
Oct. 31	Oct. 31	Oct. 31
Dec. 15	Dec. 15	Jan. 2
Dec. 15	Dec. 15	Jan. 2

**New Students**

Registration materials released  
First day to file Registration Forms  
Last day to file Registration Forms

Oct. 29**	Oct. 29**	Oct. 29
Oct. 31	Oct. 31	Oct. 31
Dec. 15	Dec. 15	Jan. 2

**Fees**

Last day to pay fees  
Last day for withdrawal from the University  
with any refund of fees

Dec. 28	Dec. 28	Jan. 2
Jan. 30	Jan. 30	Jan. 30

**Spring Quarter 1974**

<b>March 26</b>	Classes begin, 8:00 am. (Tues.)
<b>May 10</b>	Free day—No undergraduate classes, offices open (Fri.)
<b>May 27</b>	Legal holiday—Memorial Day—No classes, offices closed (Mon.)
<b>May 31</b>	Last day of regularly scheduled classes (Fri.)
<b>June 3-7</b>	Final examinations (Mon.-Fri.)
<b>June 7</b>	Spring Commencement, 9:00 a.m., Ohio Stadium (Fri.)
<b>June 7</b>	Spring Quarter ends, midnight (Fri.)

**Admission and Registration Dates****Admission Dates**

Last day to file applications for admission

<b>Undergraduate and Continuing Education Columbus Campus</b>	<b>Regional Campuses</b>	<b>Graduate and Professional*</b>
Mar. 1	Mar. 1	Mar. 1*

**Registration Dates****Scheduling****Continuing Students (enrolled Winter Quarter)**

Registration materials released in college offices  
(Graduate School at Registrar's Office)—A-K Tues., L-Z Wed.  
First day to file Registration Forms  
Last day to file Registration Forms

Jan. 29, 30	Jan. 29, 30	Jan. 29, 30
Jan. 31	Jan. 31	Jan. 31
Feb. 9	Feb. 9	Feb. 9

**Returning Students (not enrolled Winter Quarter)**

Registration materials released  
First day to file Registration Forms  
Last day to request Registration Forms  
Last day to file Registration Forms

Jan. 29	Jan. 29	Jan. 29
Jan. 31	Jan. 31	Jan. 31
Mar. 15	Mar. 15	Mar. 25
Mar. 15	Mar. 15	Mar. 25

**New Students**

Registration materials released  
First day to file Registration Forms  
Last day to file Registration Forms

Jan. 29**	Jan. 29**	Jan. 29
Jan. 31	Jan. 31	Jan. 31
Mar. 15	Mar. 15	Mar. 25

**Fees**

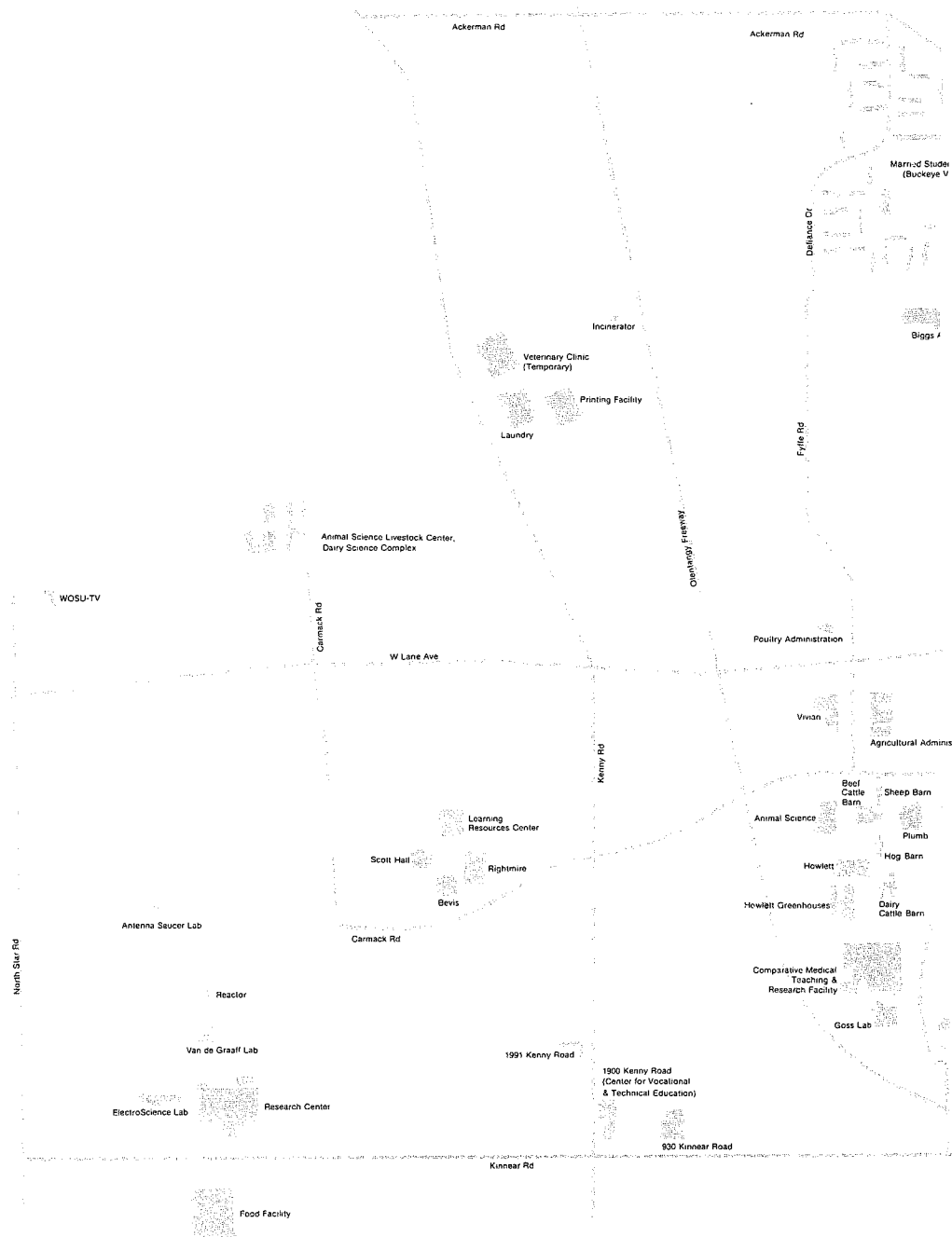
Last day to pay fees  
Last day for withdrawal from the University  
with any refund of fees

Mar. 22	Mar. 22	Mar. 25
April 22	April 22	April 22

\* Individual college calendars, last days to file applications for admission, and registration dates may vary for the professional colleges of Dentistry, Law, Medicine, Optometry, Pharmacy, and Veterinary Medicine. Consult the appropriate college offices or catalog for these dates.

\*\* New students required to participate in the Undergraduate Orientation Program will receive registration materials when they attend the program.

All dates are subject to change.



## THE OHIO STATE UNIVERSITY CAMPUS

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F                    G    H    J    K    L    M    N    O    P    Q    R

Buildings					
Administration Building	N9	Laundry Building	C3	Wiseman Hall	K13
Agricultural Administration Building	E5	Law Building	R13	Women's Dining Hall	N13
Allied Medical Professions Building	K16	Lazenby Hall	M11	Women's Field House	K12
Alumni House, Fawcett Center for Tomorrow	G3	Learning Resources Center	C8	WOSU-TV	A4
Ambulatory Patient Teaching Facility	J15	Libraries		University Officers	
Animal Science Building	E7	Health Sciences	L15	President, 205 Administration Building	N9
Animal Science Livestock Center		William O'Leary Thompson Memorial (Main Library)	M10	Executive Vice President	
Case Road Complex, Don Scott Field		Lincoln Tower	G12	205 Administration Building	N9
Sawmill Cluster, Don Scott Field		Lord Hall	O8	Provost and Vice President for Academic Affairs	
Dairy Science Complex	B3	Mack Hall	N13	308 Administration Building	N9
Antenna Saucer Laboratory	B8	MacQuigg Laboratory	O6	Acting Vice President for Administrative Operations and Executive Director of University Planning, 200 Administration Building	N9
Archer House	M5	Maintenance Building	K8	Executive Assistant to the President, 205 Administration Building	N9
Arps Hall	O8	Married Student Housing	E2	Vice President for Student Affairs, 464 Ohio Union	Q12
Baker Hall	P13	Mathematics Building	M9	Vice President for University Development, 108 Administration Building	N9
Baker Systems Engineering Building	L18	McC Campbell Hall	H16	Vice President for Educational Services, 218 College of Medicine	L15
Band Drill Area	H8	McCracken Power Plant	L9	Vice President for Regional Campuses and Dean of University College, 185 Bevis Hall	C8
Barns	E8	McMillin Observatory	N12	Executive Director of Administrative Systems, 433 Archer House	M5
Beef Cattle		McPherson Chemical Laboratory	O8	Executive Director of Finance and Treasurer, 200A Administration Building	N9
Dairy Cattle		Means Hall	J14	Executive Director of Personnel Services, 108 Archer House	M5
Hog		Mendenhall Laboratory	P11	Executive Director of University Budgets, Archer House	M5
Sheep		Merchon Auditorium	O9	Colleges	
Barrett House	O5	Metallurgical Engineering Building	O7	Administrative Science, 128 Hagerty Hall	P11
Bevis Hall	C8	Mirror Lake	M12	Agriculture and Home Economics, 100 Agricultural Administration Building	E5
Biggs Athletic Training Facility	E3	Morrill Tower	G10	The Arts, 304 Merchon Auditorium	O9
Biological Sciences Building	J13	Morrison Tower	O14	Biological Sciences, 105 Biological Sciences Building	J13
Blackburn House	N6	Murray Hall	K17	Dentistry, 120 Dentistry Building	M13
Botany and Zoology Building	M13	Natalium	N14	Education, 127 Arps Hall	O8
Boyd Laboratory	N7	Neil Hall	N10	Engineering, 122 Hitchcock Hall	M7
Bradford Commons	O13	Neil-17th Building	L9	Humanities, 105 Brown Hall	N9
Bradley Hall	N13	Neilwood Gables	M6	Law, 112 Law Building	R13
Brown Hall	N9	North Commons	N5	Mathematics and Physical Sciences, 154 Denney Hall	O9
Browning Amphitheatre	M8	Norton House	M5	Medicine, 209 College of Medicine Administration Center	L15
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Campbell Hall	M12	Nursing Building	M15	Pharmacy, 217 Pharmacy Building	H13
Canfield Hall	N13	Ohio Legal Center	R14	Social and Behavioral Sciences, 166 Denney Hall	O9
Central Service Building	L8	Ohio Stadium	H9	University College	C8
Chemical Engineering Building	N7	Ohio Union	Q12	145 Bevis Hall	C8
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Derby Hall	O9	Merchon Garage	O8	Music, 105 Hughes Hall	P9
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Drackett Tower	N5	Paterson Hall	O13	Nursing, 120 Nursing Building	M15
Drake Union	G11	Personnel Employment Offices	Q14	Social Work, 300 Stillman Hall	P8
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Evans Chemical Laboratory	O7	Plumb Hall	E7	Offices and Services	
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Food Facility	B14	Raney Commons	P5	Alumni Association, Alumni House	
French Field House	H5	Reactor Building	B10		
Garage and Laundry	K7	Research Center	B12		
Goss Laboratory	E10	Rightmire Hall	C8		
Graduate School Building	N7	Robinson Laboratory	M6		
Graves Hall	M15	ROTC Building	K5		
Greenhouses		Royer Commons	O6		
Botany and Zoology	L13	St. John Arena	J5		
Lazenby	L11	Scott Hall	C8		
Howlett	E9	Scott House	N6		
Hagerty Hall	P11	230 West 17th Avenue	M9		
Halloran House	P6	Siebert Hall	O13		
Hamilton Hall	M14	Sisson Hall	F11		
Haskett Hall	N7	Smith Hall	Q13		
Haverfield House	O6	Smith Laboratory	N8		
Hayes Hall	O9	Stadium Scholarship Dormitory	H6		
Hitchcock Hall	M7	Starling-Loving Hall	L14		
Home Management House	N14	Steep Hall	Q13		
Hopkins Hall	O9	Stillman Hall	P8		
Houck House	O5	Stradley Hall	P14		
Howlett Hall	E8	Student Services Building	Q12		
Hughes Hall	P9	Sullivant Hall	O10		
Ice Rink	J5	Taylor Tower	P4		
Incinerator	C2	Tennis Courts	K11		
Industrial Arts Laboratory	L7	Townshend Hall	L10		
Ives Hall	L2	220 West 12th Avenue	N12		
Johnston Laboratory	N7	University Hospital	K14		
Jones Graduate Tower	O5	Upham Hall	J14		
Journalism Building	M8	Van de Graaff Laboratory	B11		
1900 Kenny Road (Center for Vocational and Technical Education)	O12	Veterinary Clinic (Temporary)	C3		
1991 Kenny Road	C11	Vivian Hall	E5		
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**INSTRUCTIONS for Adviser Approval Form**

The Adviser Approval Form is provided for use by students whose colleges require adviser approval of academic programs. Since Autumn Quarter Registration Forms must be returned in August, this form is to be used in obtaining approval of programs prior to the summer vacation period when the student and/or his adviser may not be on campus. Only one form need be used unless the adviser or college requests two.

The student should meet with his adviser to decide on an instructional program, complete the form in ink, and have his adviser sign where indicated. The student will keep the completed Adviser Approval Form and include it with his Autumn Quarter Registration Form available after July 23.

Students having questions concerning the form or its use should check with their adviser or college office.

**Do not send the Adviser Approval Form in advance of the Registration Form.**

U.S. Soc. Sec. No. \_\_\_\_\_ Name \_\_\_\_\_ Last \_\_\_\_\_ First \_\_\_\_\_ Middle \_\_\_\_\_  
Major \_\_\_\_\_ Program of Courses for \_\_\_\_\_ Quarter, 19 \_\_\_\_\_

Department	Course Number	Credit Hours	M	Tu	W	T	F	S

Approved Alternate Courses	Substitute			For	
	Department	Course Number	Credit Hours	Department	Course Number

ADVISER APPROVAL FORM Complete in blue or black ink

Program Approved \_\_\_\_\_ Adviser's Signature \_\_\_\_\_ Date \_\_\_\_\_

U.S. Soc. Sec. No. \_\_\_\_\_ Name \_\_\_\_\_ Last \_\_\_\_\_ First \_\_\_\_\_ Middle \_\_\_\_\_  
Major \_\_\_\_\_ Program of Courses for \_\_\_\_\_ Quarter, 19 \_\_\_\_\_

Department	Course Number	Credit Hours	M	Tu	W	T	F	S

Approved Alternate Courses	Substitute			For	
	Department	Course Number	Credit Hours	Department	Course Number

ADVISER APPROVAL FORM Complete in blue or black ink

Program Approved \_\_\_\_\_ Adviser's Signature \_\_\_\_\_ Date \_\_\_\_\_

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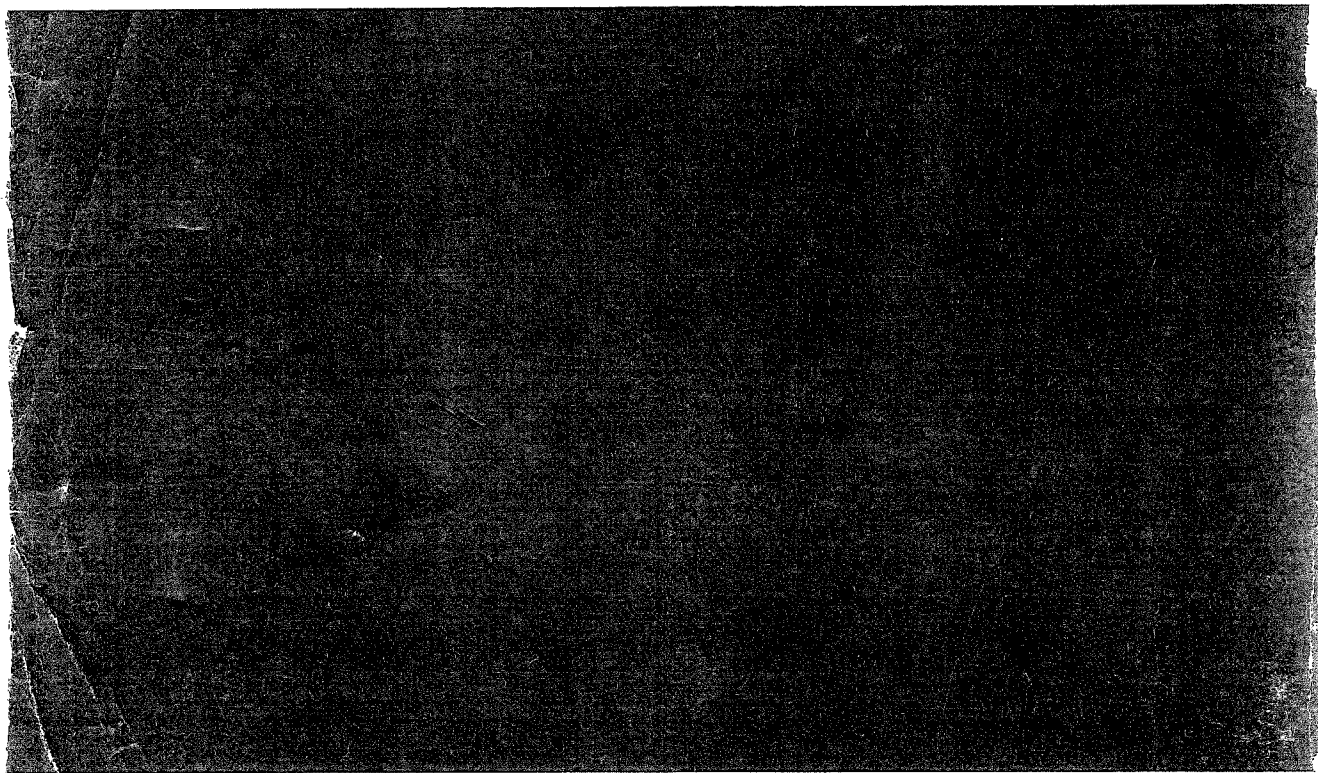
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